GENERATIONAL ACCOUNTING IN TURKEY

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ABSTRACT

GENERATIONAL ACCOUNTING IN TURKEY

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Generational Accounting (GA), developed by Auerbach. Gokhale and Kotlikoff (1991) is an alternative and dynamic method employed in measuring the impact of existing fiscal policies on current and future generations. The method is based on the government's intertemporal budget constraint which principally requires that the present value of current and future generations' net tax payments plus the existing net wealth be sufficient enough to cover for government's future consumption. In contrast to the traditional and static measures of fiscal sustainability, GA method reveals the intergenerational distribution of tax burden and helps identifying the policies that can alleviate the generational imbalance. This paper constructs and presents the first set of generational accounts for Turkey in an attempt to measure the generational gap and compare the Turkish intergenerational fiscal outlook to a number of developed and developing countries.

Keywords: Generational Accounting, Fiscal Sustainability

ÖZ

TÜRKİYE'NİN NESİLSEL HESAPLARI

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Yüksek Lisans, İktisat Bölümü
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Auerbach, Gokhale ve Kotlikoff (1991) tarafından geliştirilen Nesilsel Hesaplama (NH), maliye politikalarının farklı nesillere olan etkisini ölçmek için kullanılan alternatif ve dinamik bir yöntemdir. Yöntem, bugünün ve gelecek nesillerin ödeyeceği net vergilerin şimdiki değerinin, devletin net değeriyle olan toplamının, devletin gelecekteki tüketimini karşılamaya yeterli olması gerektiği ilkesine dayanır. Geleneksel borç sürdürülebilirliği hesaplamalarının aksine NH, vergi yükünün nesiller arası dağılımını ortaya çıkarır ve nesilsel dengesizliğin giderilmesi için politika önerilerinde bulunur. Bu çalışma Türkiye için ilk nesilsel hesapları vermekte ve Türkiye'nin mali görünümünü gelişmiş ve gelişmekte olan ülkelerle karşılaştırmaktadır.

Anahtar Kelimeler: Nesilsel Hesaplama, Mali Sürdürülebilirlik

To My Parents

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LIST OF ABBREVIATIONS

BRICS	Brazil, Russia, India, China and South Africa
CBRT	Central Bank of Republic of Turkey
ESA ’95	European System of Accounts
EU	European Union
GDP	Gross Domestic Product
ILO	International Labor Organization
IMF	International Monetary Fund
OPEC	Organization of the Petroleum Exporting Countries
SDR	Special Drawing Rights
UN	United Nations
UK	United Kingdom
US	United States

CHAPTER
1

INTRODUCTION

Macroeconomic discussions have predominantly been centred on the monetary sphere in the past decades. However the recent developments, especially the Eurozone sovereign debt crisis is ushering that fiscal policy will be at least as of equal concern in the upcoming years. Massive bailout budgets combined with the ageing population problem and generous social security systems are likely to threaten the sustainability of fiscal balances both in the US and a number of European countries. While uncertainties about the future of many economies remain, it is evident that additional government debt burdens are likely to undermine the budgetary positions and alter the intergenerational fiscal equity. The need for a long term fiscal view will necessitate the utilization of new and dynamic tools, one of which is the Generational Accounting.

Generational Accounting (GA) was developed as a response to the common discontent with the static measures of fiscal sustainability and it has become increasingly popular as a method to assess the distribution of government's debt burden among different generations. After its introduction Gokhale, Auerbach and Kotlikoff (1991), the methodology has been revised, improved and applied to a number of developed and developing countries, especially in the late 1990's and early 2000's.

The main argument of those who favour GA is that deficit-the simple difference between government's aggregated revenues and expenditures- is a concept that can easily be manipulated. Depending on how the government chooses to label its receipts and payments, the deficit figure may vary substantially. The practice of dragging expenditures to the next fiscal year's budget to undervalue deficit, excluding deficit generating public institution's balances from the central budget sheet, creating extra-budgetary funds to hide certain liabilities, privatising state owned enterprises to raise revenue, resorting to one time taxes at

times of downturns and practising rebates and amnesties as part of the political cycle are just few examples of how the concept of deficit can easily be manipulated according to the political and economic priorities. Moreover, major studies find mixed evidence about the direction and magnitude of the relation between deficit and key macroeconomic variables. Henceforth it is to be admitted that deficit is an ill-defined and arbitrary concept in understanding the fiscal structure and sustainability of a country.

The main contribution of this thesis is to construct and present the first set of generational accounts for Turkey in order to evaluate fiscal sustainability by investigating the intergenerational distribution of debt burden and to give policy recommendations to alleviate the generational imbalance. In this respect, this will be the first study to go beyond the standardized measures of budget deficit and primary balance and analyse the fiscal gap from an intergenerational perspective, namely how the government's debt burden is generated among different age and gender groups. In addition to that, the effect of different policy exercises on long term fiscal gap and intergenerational distribution of debt burden have been investigated. Foreseeing that the methodology will be revived in line with the recent and upcoming fiscal developments, we strongly believe that it is essential to acquire comparable figures for Turkey. Thus the main contribution of this thesis is to calculate the Turkish generational accounts for the first time

The study is organized as follows: development of the GA literature, evolution of the methodology and the major studies will be presented in Chapter 2. Chapter 3 will provide a summary of the Turkish fiscal history from 1923-2012, the emphasis being on the past three decades. Distinctive features of the current tax, transfer and social security system as well as the reforms in progress will be presented in Chapter 4. Chapter 5 will summarize the data and statistics used in the study. The results, sensitivity analysis and policy experiments will be presented in Chapter 6. Chapter 7 will conclude the discussion.

CHAPTER
2

GENERATIONAL ACCOUNTING: DEVELOPMENT, METHODOLOGY AND EMPIRICAL EVIDENCE

This chapter will briefly outline the empirical and theoretical studies that underpin the Generational Accounting (GA) methodology. After a concise discussion of the development of the literature, the methodology and the assumptions of the model will be presented in detail. Through the discussions, the main arguments of the proponents of GA methodology and their criticism toward the adoption of budget deficit as a method to assess fiscal sustainability will especially be emphasized. The rest of the chapter will discuss and compare the results of GA studies from a number of developed and developing countries.

2.1 Development of the Generational Accounting Literature

The GA methodology was developed in 1991 by the seminal paper of Auerbach, Gokhale and Kotlikoff yet the discussions that underpin the theoretical background of the methodology, especially the intergenerational aspect of fiscal policy and the necessity for a dynamic measure of government burden, dates back as early as 1960's.

Although there had been efforts to analyse the distributional effects of fiscal policy (Vickrey, 1961, Musgrave, 1963, Eisner, 1969, Minsky, 1973), these studies have remained rather static in nature, being merely concerned with the impacts of policy actions on various income and consumption groups among existing generations.

Being inspired by Modigliani's life cycle theorem (1963), Feldstein (1974) studied the negative effect of unfunded social security system on personal savings and eventually ignited a broader discussion on how the long term growth path of the economy can be altered by short term policy actions, regarding taxes and transfers (Auerbach and Kotlikoff, 1990). Kotlikoff (1979) and Summers (1981) analysed the impact of social security and tax reforms on individual consumption and saving behaviour by using a 55 period life cycle models and incorporating intergenerational transfers to capture the dynamic nature of the economy. Studies confirmed that both the choice of the social security system and the tax base have long run impacts on the capital stock of the economy and the generational distribution of welfare. Auerbach (1979), Boskin (1978) and Bradford (1981) were among others who were concerned with the long run distributional aspects of fiscal policy.

The idea that the long term growth path of the economy can be altered by short term policy changes in a dynamic framework where the existing individuals' consumption and saving behaviours in a given point in time can alter the distribution of wealth across generations was a turning point in the development of the GA methodology. It was confirmed by Kotlikoff (1989) and a number of other authors that both the size and the way through which the government finances its spending mattered in the long-run. Hence both the deficit concept itself and the idea of Ricardian Equivalence were put under critique. Evaluation and cross validation of these critiques by a number of writers combined with the necessity to incorporate the lifecycle decision theory and the intertemporal budget constraint driven the development of the GA.

Before moving on to the methodological aspects of GA we shall dwell further on the insufficiency of the deficit concept as a variable to comprehend the long term fiscal stance and the failure of Ricardian equivalence as way to handle government spending.

First of all, as pointed out by Kotlikoff (1988), deficit, the simple difference between the annual revenues and expenditures of the government is very much of an arbitrary concept that fails to reveal anything about the fiscal stance of the economy. Indeed the relation between budget deficit and the key macroeconomic variables such as GDP, growth rate, inflation, interest rate[1] and current account deficit is one of the most debated yet not resolved issues. There exists mixed evidence about the magnitude and direction of such correlation.

Secondly, depending on how the government chooses to label its receipts and payments might alter the size of the deficit and the debt burden considerably. Kotlikoff (1989) points out that if, for example, the social security contributions were labelled as loans extended to the government by households (instead of taxes) and the social security benefits as the principal plus the interest payment (instead of transfers), then the US official debt would roughly be tripled by size.

Thirdly, there are many fiscal practices that the government might adopt to undervalue the deficit and the debt burden. The practice of dragging expenditures to the next fiscal year's budget to undervalue deficit figures, excluding deficit generating public institution's balances from the central budget sheet, creating extra-budgetary funds to hide certain liabilities, privatising state owned enterprises to raise revenue, resorting to one time taxes at times of downturns and practising rebates and amnesties as part of the political cycle are just few examples of how the concept of deficit can easily be manipulated according to the political and economic priorities.

A final and rather technical critique of conventional budget deficit measures by the GA literature relates to the Ricardian Equivalence and the traditional notion of "deficit sending". Ricardian Equivalence (also known as the Barro–Ricardo equivalence) postulates that it is

[1] See Dwyer (1982), Boskin (1982), Plosser (1982, 1987), Mascaro and Meltzer (1983), Evans (1985, 1987), Hoelscher (1986), Barro (1987), Bohn (1998), Saleh (2003) and Catão and Terrones (2005) for unconventional evidence on the correlation among budget deficit and macro aggregates and discussions on causality.

only the size not the way through which the government finances its spending hence there is no difference between issuing bonds or levying taxes.[2] Empirical evidence on the other hand asserts that there are indeed significant differences between the practice of taxation and borrowing (and any other policy action), especially regarding the intergenerational distribution of wealth and welfare (Pereira and Rodirguez, 2001).

As a response to the proclaimed drawbacks of the budget deficit, Auerbach, Gokhale and Kotlikoff (1991) developed the GA methodology as an alternative tool to assess the fiscal sustainability. The method did not only serve the purpose of constructing a meaningful way to evaluate the long term outlook of the budget balance but also revealed a number of undisclosed feature related to the intergenerational distribution of net tax burden in the US. The results were striking for that they revealed a 17%-24% fiscal gap among current and future generations, a gap much wider than what had been expected. The contributions of the paper will be discussed in further depth in the upcoming chapters but before that the assumptions underlying the GA methodology, the rationale behind the calculations and the extensions made to the model will be discussed.

2.2 The Methodology

Generational accounting is based on the government's intertemporal budget constraint which principally requires that the present value of current and future generations' net tax payments plus the existing net wealth be sufficient enough to cover for government's future consumption. The analytical reasoning behind GA can simply be formulated in the following manner[3];

[2] Ricardian Equivalence (RE) is perceived as an extension of the Permanent Income Hypothesis. Assuming that agents (households in this case) internalize government's budget constraint, the model predicts that whether the government chooses to finance its spending through taxation (short term policy action) or issuing bonds (long term policy action) is of no significance. There are several papers investigating the presence of RE under both the Permanent and the Life-Cycle Income Hypothesis, the results of which are at best mixed. Further details of the discussion can be found in Ricciuti (2003), Das (2010) and Stein (2011).

[3] $B=C+D-A$, where A is the present value of the remaining net life time tax burden of the current generations, B is the present value of the net life time tax burden of the future generations, C is the present value of the government's future consumption and D is the government's net wealth (or indebtedness). The idea is that any liability of the government that remained unpaid by the current generation should be borne by the future generations. Therefore B is calculated as a residual.

Present Value (PV) of Net Tax Payments of Current Generations (A)	+	PV of Net Tax Payments of Future Generations (B)	=	PV of Government's Future Consumption (C)	+	Government's Net Wealth (D)

or;

$$\sum_{s=0}^{L} N_{t,t-s} + \sum_{s=1}^{\infty} N_{t,t+s} = \sum_{s=t}^{\infty} G_s (1+r)^{-(s-t)} + W_t \qquad (1)$$

where;

$N_{t,t-s}$: Present value of the remaining net taxes for the current generation born in year *t-s;*

$N_{t,t+s}$: Present value of the net taxes for the future generation born in year *t+s;*

L : Maximum life span;

G_s : Government consumption;

W_t : Government's net wealth at time *t*;

r : The discount rate.

The first term on the left-hand side of the equation represents the present value of the remaining net tax (all taxes paid less transfer received) burden of the existing generations. An individual born in the base year is represented by $N_{t,t}$ and is assumed to live a life span of $L-s(=0)=L$ years while an individual born in year $t-L-1$ will bear a net tax burden of just one year. Generational accounts of all cohorts will be added up in this fashion until the last member of the current generation dies. The second term on the left hand side of the equation, in a similar fashion to the first one, represents the present value of the net tax payments of future generations. The term initiates from the first future generation after the base year and sums the relevant net tax burdens until infinity. The notion of "discounting to the present value" is incorporated in the following way[4];

[4] The formulation is adopted from Auerbach, Kotlikoff and Leibfritz (1999).

$$N_{t,k} = \sum_{s=\max(t,k)}^{k+L} T_{s,k} P_{s,k} (1+r)^{-(s-t)} \qquad (2)$$

where $N_{t,k}$ is the generational account of a cohort born in year k, $T_{s,k}$ represents the expected net tax payments received from the k^{th} cohort in year s, $P_{s,k}$ is the number of individuals from the k^{th} cohort alive in year s, $(1+r)^{-(s-t)}$ is the discount factor (r stands for the real interest rate). $s = \max(t,k)$ implies that if the individual is born before the base year ($k \le t$) then the remaining life time tax burden is discounted to the base year whereas if the individual is born after the base year ($k > t$)the whole life time burden is aggregated and discounted. This reflects the fact that generational accounts are forward looking calculations meaning payments made or benefits received from the government before the tax year is not taken into account.

The first term on the right hand side of the equation stands for the government consumption which is assumed to grow constant rate equal to the growth rate of the overall economy. It is discounted to present value by the term $(1+r)^{-(s-t)}$. The last term W_t stands for the negative net wealth (liabilities-assets) of the government. A positive W_t term would indicate that the liabilities of the government exceed its assets hence assuming a predetermined level of government consumption and tax revenue from the current generation, the amount borne by the future generations increase. W_t can also be considered as the net indebtedness of the government.

The initial step of constructing generational accounts is to calculate the age and gender specific distribution of net tax burden, namely the sum of all payments (income tax, corporate tax, indirect taxes, taxes on property…etc.) less all receipts (health care, education, widow orphan benefits, pensions…etc.) for current generations. Adopting from Raffelhüschen (1999), this can be represented as follows,

$$T_{s,k} = \sum_{n} \tau_{s,k,n} \qquad (3)$$

where $\tau_{s,k,n}$ is the average per capita tax or transfer burden of an $s-k$ aged individual in year *s*, *n* being the various payment or receipt item. The second step is to project these tax and transfer aggregates to the future by making use of a valid growth assumption. In general it is assumed that the annual growth of taxes and the transfers realize at a rate equal to the productivity growth and it is constant throughout (meaning there will not be any fiscal structural change).

$$\tau_{s,k,n} = (1+g)^{s-t}\tau_{t,t-(s-k),n} \tag{4}$$

Equation 4 is critical in calculating the net tax burden of future generations. It says that the net tax burden borne by an unborn individual of a specific age group is a function of the net tax burden borne by the members of the current generations of that same age.

To visualize the relevant discussion one can think of a very simplistic economy where individuals live for only two periods. At year *t*, two generations (Cohort 1 and 2) coexist and the relevant net tax burdens are *a* and *b*, respectively. In year *t+1*, Cohort 2 leaves the economy. Simultaneously, Cohort 1 reaches the age, hence the tax category of Cohort 2 thus the net tax burden borne amounts to *b(1+g).* In the following year (year *t+2*), the future generation represented as Cohort 0 joins the economy and bears a net tax burden of *a(1+g).*

	Year *t*	**Year *t+1***
Cohort 1	*a*	*b(1+g)*
Cohort 2	*b*	*0*

	Year *t+1*	**Year *t+2***
Cohort 0	*a(1+g)*	$b(1+g)^2$
Cohort 1	*b(1+g)*	*0*

After the construction of future tax and transfer projections specific to the age and gender categories, these figures are aggregated as explained in Equation 2. For the current generations, the ratio of the remaining life time net tax burden to the number of cohort members alive in the particular base year yields that cohort's generational account;

$$GA_{t,k} = \frac{N_{t,k}}{P_{t,k}} \tag{5}$$

As emphasized by Raffelhüschen (1999) and Bonin and Patxot (2004), different cohorts of the current generation cannot be compared to one another. Indeed, because of the forward

looking nature of GA, there is no rationale in comparing the accounts of say a 25 year old male to those of 60 years old. Instead, in order to find the generational imbalance, the current and the future new-borns should be compared. This builds upon the idea that under the presence of perfect generational equality, the net tax burden of the current and the future new-borns should only differ by the productivity growth factor;

$$GA_{t,t} = (1+g)GA_{t+1,t+1} \tag{6}$$

If that is not the case and there exists a wider gap among the fiscal burden of current and future generations (either to the favour of former or the latter), then it is calculated as follows;

$$\theta = \frac{GA_{t+1,t+1}}{GA_{t,t}(1+g)} \tag{7}$$

If $\theta > 1$ then one shall conclude that there exists a generational imbalance to the advantage of the current generations and vice versa if $\theta < 1$. The $\theta = 1$ case would suggest generational equality, as denoted.

2.3 Empirical Evidence from Different Countries and Extensions to the Model

The first empirical study to develop generational accounts was by Auerbach, Gokhale, Kotlikoff (1991). The study revealed that future new-borns were expected to pay roughly 17%-24% more than a current new-born, an amount much higher than what has been implied by the conventional budget deficit figures. Authors addressed the impact of a number of fiscal policy changes, namely the effect of a cut in the capital gains, faster growth in Medicare, slower government consumption growth, loan bailout and cancellation of the 1983 social security amendments. The follow up 1994 paper suggested alternative fiscal measures to alleviate the US fiscal imbalance[5]. The 1999 and 2000 papers by Auerbach and Oreopoulos aimed to extend the baseline study under the immigration hypothesis. The most significant contribution of the study was incorporating a degree of heterogeneity to the

[5] This part of the discussion was motivated by the US Congress proposal suggesting a 30% cut-down on the payroll taxes to avoid surplus accumulation in the Social Security trust fund (Auerbach, Gokhale and Kotlikoff, 1994). Authors emphasize that whatever fiscal measure is adopted, like the one stated, it inevitably comes with a long term cost that should be born either by the current and/or future generations.

members by differentiating among the tax and transfer schemes of the natives and the immigrants, which added further differentiation to the age-gender specification. The study did not make a conclusive statement about the impact of immigration on fiscal policy however it constituted an exemplar for the case studies especially for the European countries and Canada whose demographic profiles are expected to change significantly within the short run due to immigration.

While the original US case was under progress on one side, the GA literature started to mount up by studies from other countries. The initial seventeen of these country analysis[6] are compiled in the book titled "Generational Accounting around the World" edited by Auerbach, Kotlikoff and Leibfritz (1999). (See Table 1 for the summary of these seventeen studies as well as other independent papers).

In a number of countries, results indicated an imbalance among generations mainly to the disadvantage of those who are not yet born. Norway, with a percentage imbalance of 4018% ranked the first in terms of the size of fiscal burden inherited to the future generations however one point needs to be clarified; in contrary to the benchmark US case, education is not treated as a government consumption item but as a transfer in the Norwegian case study. Since such treatment inflates current generation's transfer receipt item drastically, the generational gap has widened to a level that cannot be compared to the rest of the studies.

Among the European countries, Netherlands, Germany, Italy and France accounts (for the base year 1995) displayed excessive imbalance mainly due to the generous transfer and social security schemes adopted. Population ageing problem that is deemed to suppress the pool of workers and inflate the elderly population is another factor that contributed to the accumulation of unfunded liabilities under the pay-as-you-go social security scheme and eventually the deterioration of generational equity. Latin American countries Argentina, Brazil and Mexico who have suffered from prolonged periods of debt crisis also appeared to generate significant degrees of intergenerational inequity given the existing fiscal structure and the level of debt.

Some of the country studies reviewed in Table 1 went beyond the standard methodology and contributed to the literature by examining the effect of structural changes or by

[6] Argentina, Australia, Belgium, Brazil, Canada, Denmark, France, Germany, Italy, Netherlands, New Zealand, Norway, Sweden, Thailand, Japan, Portugal and an update for the USA.

incorporating different variables. The first one of these is the German case studied by Gokhale, Raffelhüschen and Walliser (1995) that aimed to measure the fiscal burden of the German unification, and constituted an exemplar for the Korean study (Auerbach, Chun and Yoo, 2004) that aimed to weigh the generational cost of such unification for Korea.

The former study emphasizes that the unification of East and West Germany had necessitated substantial transfers from the central government especially to support the economically disadvantaged citizens of former East Germany and to improve the infrastructure in the underdeveloped regions. Taking the additional fiscal burden created by these transfers into account, the study finds evidence of a noticeable intergenerational imbalance to the disadvantage of future generations. The latter paper suggest that due to the wide productivity and population gap between the North and the South Korea, a supposed Korean unification would be much costly compared to the German case. Results are indicative of a fiscal burden that would be borne by the future South Korean citizens.
The paper by Auerbach and Oreopoulos (1999) has also been noticeable in this sense. The paper addressed the long term fiscal impact of immigration in the US economy. Although the analysis did not reach a decisive conclusion about the ultimate effect of immigration, methodologically the paper was the first to construct heterogeneous accounts (for the natives and the immigrants) that went beyond age and gender specification. The "heterogeneity methodology" has not been fully incorporated to the literature. Nevertheless one should realize that policy recommendations arising from such an analysis would be much more precise[7].

Follow-up studies have also been a major contribution to the GA literature. The paper by Kotlikoff and Stijns (1999) finds evidence of a 61% fiscal imbalance to the disadvantage of future generations in Belgium by using 1995 accounts. Decoster, Flawinne and Vanleenhove (2010) reconsider the Belgium case for 2007 and find out that the direction of the imbalance have been reversed in the course of time. Their results indicate a 251.9% higher fiscal burden for the current generations (although both the male and female accounts of current and future generations are calculated as negative-meaning Belgians receive more

[7] The heterogeneity in this argument refers to the differentiation of cohort accounts according to various specifications like the occupation, region or level of educational attainment. If data permits, then the results gathered from such an analysis would enable researchers to develop more accurate policy recommendation. For instance, if the net tax burden of city and village inhabitants (two groups that differ drastically in terms of demography and productivity) could have been differentiated, then different and more "tailor made" policy measures could have been formulated. Unfortunately, even the basic age-gender specification comes with a myriad of technical problem, let alone introducing heterogeneity.

than what they pay; an inherently unsustainable fiscal pattern). The two consecutive studies by Sartor, Kotlikoff and Liebfritz (1999) and Cardarelli and Sartor (2000) verify the existence of an intergenerational imbalance to the advantage of current Italian generation, although the magnitudes of this imbalance are different (see Table 1). This kind of sequential studies are important for the GA literature because they enable us to see how the intergenerational distribution of government's debt burden has been reallocated among generations within the course of time. This serves the ultimate goal of making GA an annual and regular calculation that will replace the budget deficit figure.

Regarding the methodology, the paper by Decoster, Flawinne and Vanleenhove (2010) which is a sequel to Raffelhüschen (1999) is especially noticeable. The authors show that under transversality and no Ponzi game condition, the generational accounts can be represented as follows[8];

$$\underbrace{\sum_{s=0}^{L} N_{t,t-s}}_{CU_t} + \underbrace{\sum_{s=1}^{\infty} N_{t,t+s}}_{FU_t} = B_t \tag{8}$$

where CU_t denotes the present value of the primary balance generated by the current generations and FU_t represents the same for future generations and B_t stands for the explicit debt stock of the economy. It says that the amount of debt that has not been covered by the amount of primary balance created by the current generations should be compensated by the primary balances of the future generations. This approach deserves additional credit for that it combined the generational perspective with the traditional measure of fiscal sustainability.

Before finishing this chapter and moving onto the calculation of Turkish generational accounts, one point should be made explicit. Apart from Denmark, Sweden, Belgium, and Thailand all studies in late 1990's indicated a generational imbalance to the disadvantage of

[8] Authors use the standard law of motion of debt accumulation represented as $B_{t+1}= (1+r). B_t - PB_{t+1}$ where B_t is the debt stock in time t, r is the discount rate, PB_{t+1} is the primary balance of the next period. The debt stock in time $t+1$,B_{t+1} is defined as the primary repayment plus the interest repayment on debt less the primary balance. Under the assumptions and calculations carried out by the authors, a convergence between this traditional approach and the GA is proven. See Decoster, Flawinne and Vanleenhove (2010) for a detailed discussion.

future generations however the question whether these results are relevant to understand the current stance is an issue to be handled carefully. First of all, this was the pre-Maastricht period for the European countries meaning compared to the years thereafter; the fiscal policy was relatively loose and rather discretionary. Secondly, there had been significant changes in the legal framework underlying the pensionable age, tax base, social security system and the transfer payments. Moreover, policies have been developed against the frequently underlined problem of population ageing. That, combined with the fact that budgetary outlook of US and EU have been massively distorted within this four years' time, one should keep in mind that the results are not perfectly comparable to the current fiscal outlook of Turkey. However the aim of this study is to construct the very first generational accounts with the prospect of future comparison hence our efforts are still relevant.

Table 1: Generational Accounts for Various Countries

Author	Country	Year	Currency	Current Newborns			Future Generations	Absolute Imbalance	Percentage Imbalance
				Males	Females	Total			
Altamir,a, Kotlikoff, Leibfritz	Argentina	1994	U.S. dollars, thsnd.	21,8	5,7	13,9	24,3	10,4	74.8
Ablett, Kotlikoff, Leibfritz	Australia	1994/95	U.S. dollars, thsnd.	105,1	52,8	79,6	105,2	25,6	32.2
Kotlikoff, Stijns	Belgium	1994	U.S. dollars, thsnd.	N/A	N/A	43,2	90,4	47,2	109.25
Decoster, Flawinne, Vanleenhove	Belgium	2010	Euros, thousands	-55,5	-186,0	-119,2	181,0	300,2	-251.9
Malvar, Kotlikoff, Leibfritz	Brazil	1995	U.S. dollars, thsnd.	17,3	2,8	10,2	22,1	11,9	116.4
Oreopoulos, Kotlikoff, Leibfritz	Canada	1995	U.S. dollars, thsnd.	88,7	22,1	56,3	58,0	1,7	3.1
Jensen ,Raffelhüschen	Denmark	1995	U.S. dollars, thsnd.	35,0	-73,0	-18,0	26,0	-44,0	-244.4
Levy, Dore, Leibfritz	France	1995	U.S. dollars, thsnd.	82,2	37,2	105,0	117,3	57,6	96.4
Raffelhüschen, Walliser, Leibfritz	Germany	1995	U.S. dollars, thsnd.	155,2	36,0	97,1	248,8	151,7	156.1
Gal, Simonovitz, Szabo, Tarcali	Hungary	1996	U.S. dollars, thsnd.	N/A	N/A	8,4	43,9	35,5	422.6
Sartor, Kotlikoff, Leibfritz	Italy	1995	U.S. dollars, thsnd.	89,3	39,0	64,8	209,9	145,1	223.8
Cardarelli, Sartor	Italy	1998	Lire, millions	35,9	-80,8	-22,7	77,2	99,8	440.8
Sarrapy, Caso	Mexico	1997	U.S. dollars, thsnd.	7,4	7	7,2	6,4	0,6	-10.8

Table 1: Generational Accounts for Various Countries (continued)

Author	Country	Year	Currency	Current Newborns			Future Generations	Absolute Imbalance	Percentage Imbalance
				Males	Females	Total			
Bovenberg, Rele, Leibfritz	Netherlands	1995	U.S. dollars, thsnd.	N/A	N/A	49,4	137,0	87,6	177.1
Baker, Kotlikoff, Leibfritz	New Zealand	1995	U.S. dollars, thsnd.	47,7	-13,3	18,0	16,0	-2,0	-10.8
Steigum, Gjersem, Leibfritz	Norway	1995	U.S. dollars, thsnd.	64,9	-65,8	1,4	57,3	55,9	4018.0
Takayama, Kitamura, Yoshida	Japan	1995	U.S. dollars, thsnd.	N/A	N/A	73,0	319,4	246,4	337.8
Jablonowski, Müller, Raffelhüschen	Poland	2007	Zloty, thousands	N/A	N/A	-55,0	125,0	180,0	-327.3
IMF Staff Working Paper	Singapore	1999	Singapore dlrs., thsnd.	70,9	-111,0	-20,1	-386,1	-366,0	-375
Auerbach, Chun	South Korea	2004	Won, thousands	72,1	39,0	56,4	122,2	65,9	117
Hagemann, John, Leibfritz	Sweden	1995	U.S. dollars, thsnd.	213,6	153,6	184,4	143,5	-22,2	-22.2
Kakwani, Krongkaew,Leibfritz	Thailand	1993	Baht, thousands	-189,3	-97,4	-143,4	-215,8	-72,5	50.5
Author's own calculation	Turkey	2008	TL, thousands	49,5	-1,30	24,2	30,3	6,1	24.3
McCarthy, Sefton, Weale	UK	2008	Pounds, thousands	N/A	N/A	68,4	159,7	91,3	133.5
Cardarelli, Sefton,Kotlikoff	UK	1997	U.S. dollars, thsnd.	52,4	1,5	26,9	39,0	12,1	44.9
Gokhale, Page, Sturrock	US	1995	U.S. dollars, thsnd.	77,4	51,9	64,7	194,2	129,5	200.3
Auerbach, Oreopoulos	US	1999,0	U.S. dollars, thsnd.	79,2	55,5	67,4	67,1	-0,3	-0.4

CHAPTER
3

TRANSFORMATION OF THE TURKISH FISCAL SYSTEM

The accurate interpretation of the generational accounts requires extensive knowledge on the fiscal atmosphere of the country studied. That is because, despite being susceptible to political cycles, fiscal regimes are predominantly shaped by institutions that cannot be altered by immediate policy action. Hence any structural vulnerability that has accumulated in the economy as well as any behavioural pattern like tax avoidance or evasion and tax morale should be understood insightfully in order to comprehend the root causes of generational imbalance.

To provide that basis, this chapter will briefly review the Turkish economic history with a special emphasis on 1980-2012 which has been a rather significant period in terms of fiscal transformation.

3.1 From a Self-Sustaining Economy to Fiscal Deadlock: 1923-1979

Starting off with liberal policies in 1920's, Turkey turned to a state oriented "étatist" economy in the beginning of 1930's. In this period, external conservatism of the government which manifested itself by import controls and restrictions was accompanied by an apparent degree of internal cautiousness that was marked by the balanced budget principle. Between the years 1930-1939, Turkey managed to generate moderate trade and budget surpluses despite the distortion in terms of trade and the surge in government investment expenditures. The most remarkable economic thrust of the period was the First Five-Year Industrialization Plan of 1934-1938, most of which was financed by domestic debt and taxation but relied on external debt from Soviet Union and Britain as well (Soylu and Yaktı, 2012).

After WWII, Turkey became a net beneficiary of the reconstruction efforts around the world and as part of the Marshall Plan the country received 62.4 million dollars of foreign aid between the years 1948-1951 and 72.8 million dollars of foreign capital between 1952-1956 from US alone (Ertem, 2009). Karagöl (2010) denotes that the foreign debt stock of Turkey increased by more than 800% in this period mainly due to the agricultural credits received. Due to liberal policies, easy credit conditions and reliance on foreign capital the gap between imports and exports widened and the loosening of budgetary discipline caused consecutive yet moderate budget deficits from 1950 to 1963.

From the mid-1960's to the end of 1970's, Turkey adhered to conservative policies with the intention of developing the domestic industry. In this period as part of the import-substituting industrialization (ISI), severe restrictions were placed on the importation of final goods. On the other side, domestic producers were supplied with generous tax, input procurement and exchange rate incentives to encourage exports. The intention was to develop the domestic production base and create the potential to produce previously imported goods however the ISI strategy failed massively. Economy's reliance on imported intermediate goods increased and the lack of competition boosted domestic prices. This created abnormal profits for the producers and discouraged them from engaging in exporting. Since the surge in imports could not have been sustained and compensated by the increase in exports and the private sector was neither capable of nor allowed to find

resources from abroad, the government repeatedly resorted to foreign credits. The IMF involvement in Turkish economy became rather continuous and "chronic" in this period[9].

In spite of the accumulation of chronic problems, the fiscal outlook of Turkey had remained positive throughout the period until the balances were distorted by exogenous shocks, namely the oil price increase by OPEC in 1973 and the excessive fiscal burden of the Cyprus Peace operation in 1974. In annual terms, the budget deficit peaked in 1977 and remained high in the two consecutive years. In this period Turkey strived to consolidate its short term liabilities and tried to implement a stabilization program under the surveillance of IMF. Unfortunately, before the stabilization attempts succeeded the second oil price shock of 1979 further distorted the economic balances and aggravated budget deficits.

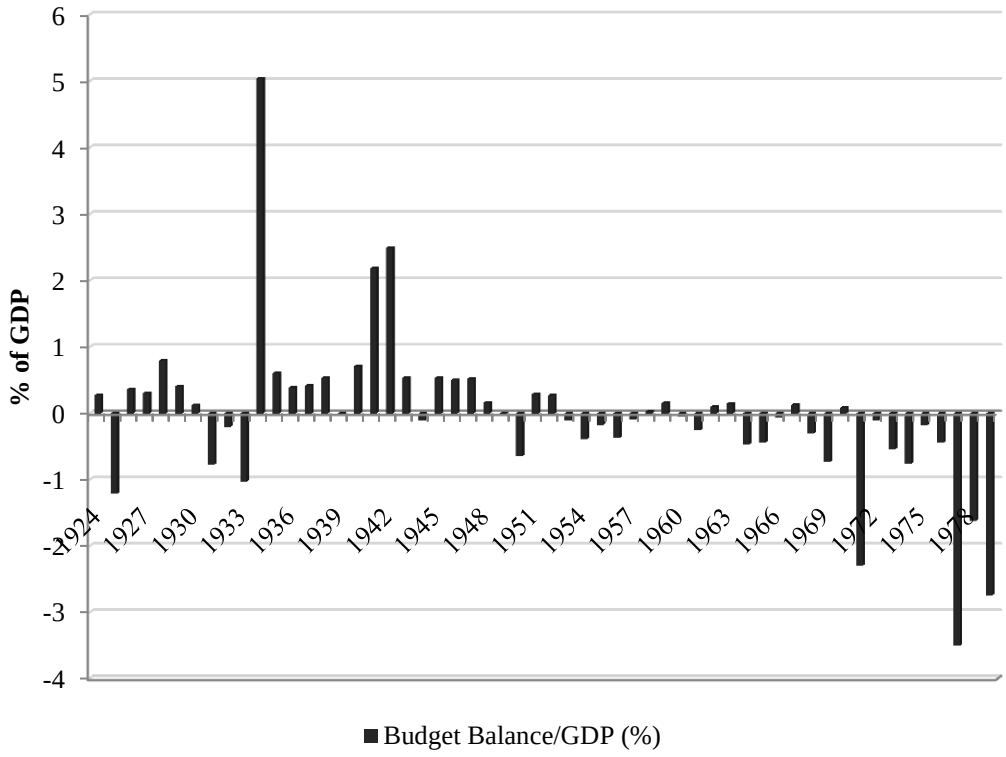


Figure 1: Budget Balance as Percentage of GDP (1924-1979)

Source: Ministry of Finance (database), Budget Figures and Budget Realizations, 2012

Figure 1 displays the ratio of budget balance to GDP for the period 1924-1979. As depicted, until the end of 1940's, Turkey had managed to display a positive fiscal outlook.

[9] In each year from 1961 to 1970 Turkey signed a stand-by agreement with IMF, most of them lasting no more than a year. (Karagöl, 2010).

Throughout 1950's and 1960's a balanced and more or less sustainable path had been caught as well. The adverse economic developments at the end of the period are reflected by peaking budget deficits.

In addition to the chronic deficit and debt problems, Turkey had also been adversely affected by the stringent credit policies applied to developing countries in this period. The two oil shocks had raised concerns about the debt repayment capacity of the underdeveloped oil-importer countries thus the credit conditions became more severe. Furthermore, the expectation that the governments would resort to a tax surge in order to compensate for the lack of international credit had discouraged both the domestic and the foreign investors.
It was all at once evident that a set of reforms and stabilization measures were the remedy to all structural problems of the economy.

3.2 The Period of Transformation: 1980-2012

On January 24, 1980, Turkey enacted a stabilization program that aimed to solve the chronic structural problems that had accumulated in almost all fragments of the economy. In exchange for 1.25 million SDR from the IMF[10], Turkey made commitment to engage in a series of structural reforms that will transform Turkish economy to a market oriented structure. Both the legislation itself and the period thereafter is crucial in understanding the near economic history because it is a turning point in Turkey's continuous efforts to articulate to the global economy and it signifies the beginning of fiscal problems that the country is still trying to cope. It should be noted that although the program was initially put into act with the objective of stabilizing the economy, the policies implemented and the end result had deviated from this purpose.

One of the major targets of the 24 January 1980 decisions was to change the inward oriented mode of production that had prevailed starting from the mid 1960's to the end of 1970's. In line with this objective, Turkey had switched to an export-led growth strategy in this period and adopted structural changes that can enhance and complement the relevant regime. Private sector was provided with a wide range of incentives, trade and financial accounts were liberalized. Retrospectively, the policies can be evaluated as successful; economic growth more than doubled, exports increased by more than four folds, capital inflow became abundant.

[10] Under the stand-by arrangement with the IMF, Turkey received an amount of SDR 1.25 billion for over three years in the mid-1980. (See Onis and Riedel (1993)).

The act had principally been successful in integrating Turkey to the international markets and reducing the scope of government intervention however all these came with a cost especially regarding the fiscal sphere of the economy

Table 2: Expenditure, Revenue and Budget Deficit as Percentage of GDP (1980-1989)

	Expenditure/ GDP	Revenue/ GDP	Budget Deficit/ GDP
1980	20.3	17.2	-3.1
1981	18.9	17.4	-1.5
1982	15.1	13.6	-1.5
1983	18.7	16.5	-2.2
1984	17.1	12.7	-4.4
1985	15.3	13.0	-2.3
1986	16.7	14.0	-2.8
1987	17.4	13.9	-3.5
1988	16.6	13.6	-3.1
1989	16.9	13.6	-3.3

Source: Ministry of Finance (database), Budget Figures and Budget Realizations, 2012

One of the major fiscal amendments in this period had been the reduction of corporate tax to 40% in 1983 from its pre-amendment level of 50%. Apart from that, the range of tax allowances and exemptions regarding the corporate and the income tax had been broadened which in return created a wider scope for tax avoidance. Moreover the progressivity of the income tax had been distorted signifying a switch from unitary structure to a scheduled one. These changes in the tax system signified the redistribution of tax burden to the favour of capital. Furthermore they represented a much larger transformation, which was indeed part of a global change in the mode of thinking[11].

These tax incentives had reduced the revenue generating capacity of the economy. In 1984, the ratio of revenues to GDP had realized as 12.7% declining by 30% compared to the pre-amendment period and creating a decade high budget deficit to GDP ratio of 4.4%. The relevant gap had been compensated by the growing share of indirect taxes specifically the

[11] The reduction in the corporate tax rates by the January 24 decisions were an extension of the popular Laffer Curve approach in this period. The approach was based upon the idea that once the optimal taxation was exceeded than it was no more possible to increase the tax revenues through an increase in the tax rates. This idea of efficient and optimal taxation affected a number of countries and starting with UK and US and spreading to Continental Europe, the income and corporate taxes were reduced all over the world during mid-1980's.

introduction of Value Added Tax (VAT) in 1985. Ever since it has been enacted VAT has been an important revenue item, amounting to more than %15 in 2012.

Apart from the changes in the tax system, the debt dynamics especially the financing tools had drastically been altered in this period. On the expenditure side of the budget, wages of public workers had been increased disproportionately and the huge losses of State Economic Enterprises (SEE) had become an excessive burden. The surge in the infrastructure investments and the excessive burden of Gulf War had amplified expenditures to a level that could not be sustained by the weak tax base. Apart from these, transparency and accountability of the budget was overshadowed by the extra budgetary funds. Increased public expenditures had enhanced the public borrowing requirements however the stringent IMF surveillance had limited the foreign indebtment. Therefore the government had resorted to internal borrowing especially between 1983 and 1993. The practice had increase the real interest rate and this in return aggravated the share of interest payments in the budget steadily until it made a peak in 1994 (see Figure 3 and Figure 4).

Although opening up of the economy to external shocks and increased vulnerability due to speculation had also been decisive in the crisis of 1994, the principal reason behind was the unsustainability of the fiscal imbalance.

Fiscal austerity measures taken in May 5, 1994 included the privatisation or abatement of a number of SEE's, downward adjustment in public workers' wages, introduction of miscellaneous taxes, abolition of agricultural subventions and decline in infrastructure investment expenditures. The measures had helped improving the budget balance however the pressure of interest payment on foreign debt stock had outstripped this moderate upturn, creating deficit for the rest of the period. The fiscal burden of two earthquakes in 1999 combined with the global economic distress caused by the Asian Crisis had further increased the public borrowing requirement (see Table 3) thus the real interest rates. Due to the heavy foreign and domestic indebtedness and the continuous deficit-real interest rate vicious cycle, the period after 1990's is sometimes viewed as the "lost decade" (Demir, 2003).

In December 1999, due to prevailing budget deficit and debt problems, Turkey resorted to IMF assistance and signed the notorious 17th stand-by agreement that required Turkey's commitment to cope inflation through the exchange rate nominal anchor. As discussed

extensively in the literature, the choice of exchange rate had been convenient for the highly dollarized Turkish economy however it had been a poor instrument in managing inflationary expectations. Due to rising inflation and revaluation of the domestic currency, the real interest rates surged and this had threatened the liquidity position of the banking sector whose balance sheets relied heavily on the government bonds. CBRT's effort to extend liquidity to the markets had caused a disastrous melt down in the central bank reserves and further exacerbated the uncertainty about the exchange rate parity.

The 2001 crisis is still a debated issue in the Turkish economic literature. For the purposes of this study it will suffice to denote that the low capital adequacy ratio of the banking sector, increased vulnerability of the financial system due to heavy reliance on portfolio investments, choice of wrong nominal anchor, poor management of expectations and the political turbulence are the frequently underlined causes of crisis yet the root cause is the government's failure in servicing its debt to public banks and ultimately the private banking sector.

The post-2001 crisis period had been a time span of continuous structural renovations in a multitude of fields. With the enacting of the "Transition Program to Strong Economy" of 2001 and the "Emergency Action Plan" of 2002 the fixed exchange rate regime was abolished and the inflation targeting was adopted. The capital adequacy requirements of commercial banks were increased to ensure liquidity. Debt monetization practice was abolished by the law enacted in 2003. Amendments in the tax law, commerce law and social security, combined with the accelerated privatization efforts had helped improving the budgetary stance. Between 2002 and 2006 budget deficits had steadily declined. Moreover for the first time in Turkish economic history, Turkey managed to generate primary surpluses 3%- 5%. The fiscal outlook had been distorted by the crisis atmosphere prevailing in the international markets from the beginning of 2007[12] however the deficits continue to remain at record low.

Figure 2 displays the ratio of budget balance and primary balance to GDP for the years between 1980 and 2011.

[12] See the details of US Subprime Mortgage Crisis and the Eurozone Sovereign Debt crisis.

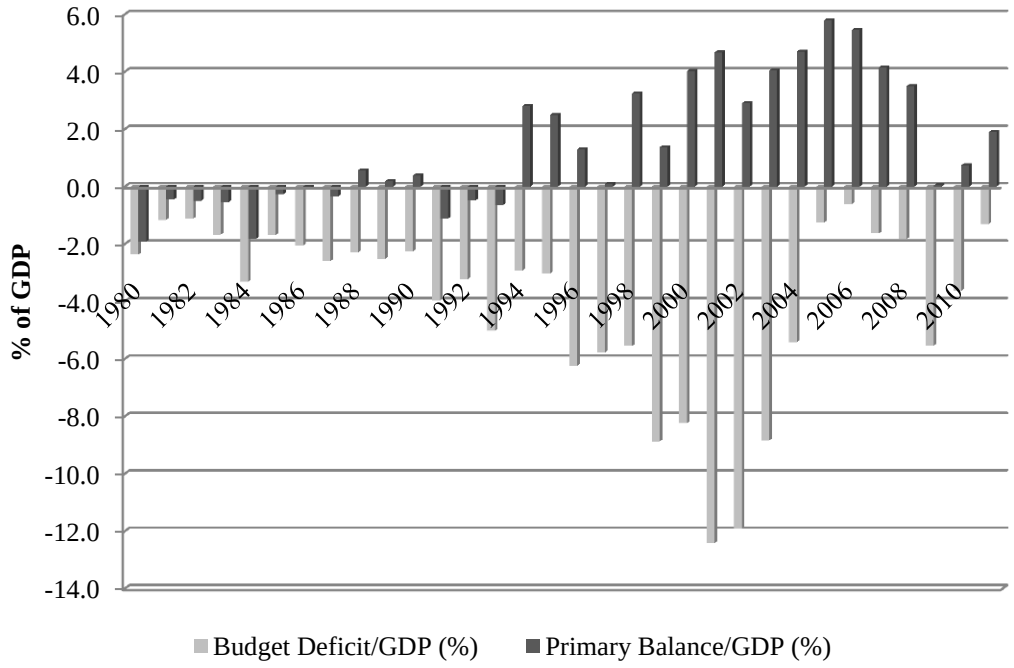


Figure 2: Ratio of Budget Balance (Consolidated/Central)* and Primary Balance to GDP (%) (1980-2011)

Source: Ministry of Development (database), Economic and Social Indicators (1950-2010), 2012; Ministry of Finance (database), Budget Figures and Budget Realizations, 2012

It should be noted that the figures belong to consolidated budget aggregates until the year 2006 and central budget aggregates from that year onwards. The initial observation is that starting from 1983 the budget deficits had become continuous, making peaks in 1984, 1994, 1997, 2001 and 2009 in line with the economic developments outlined in detail in the preceding discussions. Although Turkey has repeatedly failed to generate budget surpluses, the dynamics underlying the deficit have changed dramatically within the three decades time.

In the first half of the period budget deficits arose mainly due to a lack of primary surplus creation. From the beginning of 1980's to early 1990's the share of budget deficit in GDP remained at a moderate level until it made a peak in the fiscal crisis of 1994. As displayed in Figure 3, the interest payments remained at acceptable levels whereas the primary surplus generation has not been realized. 1994 reforms had been impactful in reducing the budget deficit to pre-crisis levels and generating primary surplus however the surge in the public sector interest payments continued to deteriorate the fiscal balances. The fiscal burden rolled over due to the rise in the real interest rates (see Figure 4).

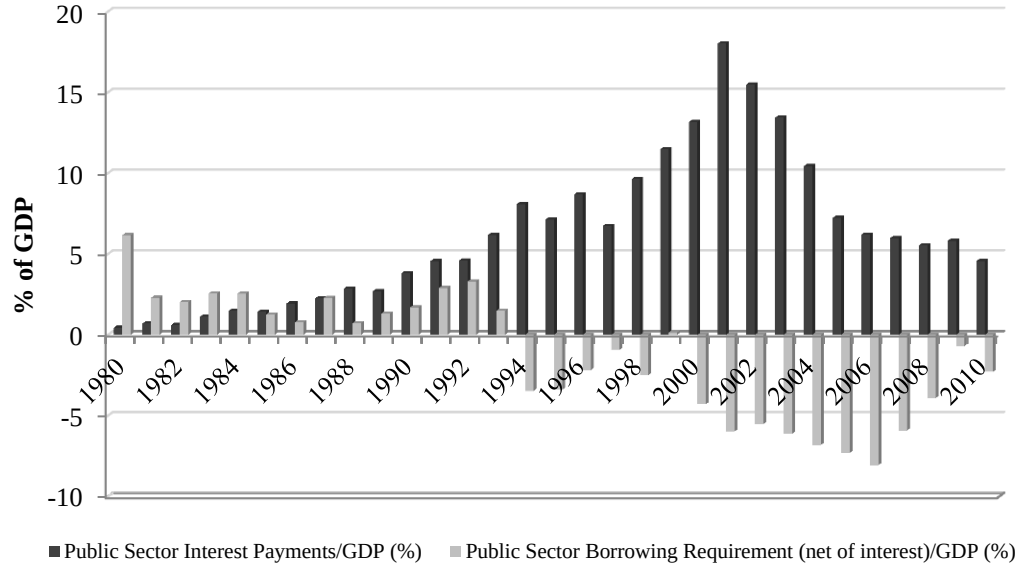


Figure 3: Distribution of Public Sector Borrowing Requirements as Percentage of GDP (%) (1980-2010)

Source: Ministry of Development (database), Economic and Social Indicators (1950-2010), 2012

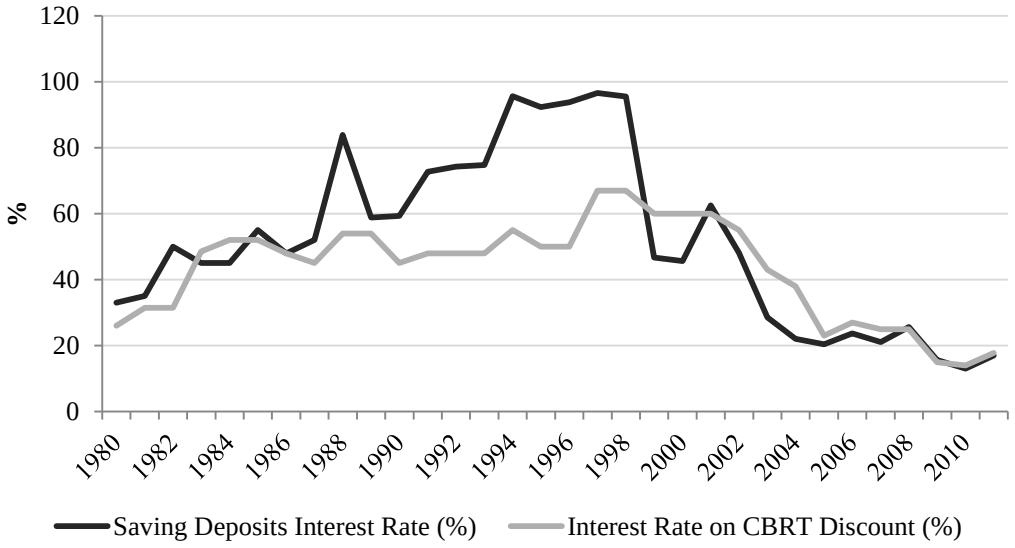


Figure 4: Interest Rate (%) (1980-2011)

Source: Ministry of Development (database), Economic and Social Indicators (1950-2010), 2012, Central Bank of Republic of Turkey, Rediscount and Advance Rates, 2012

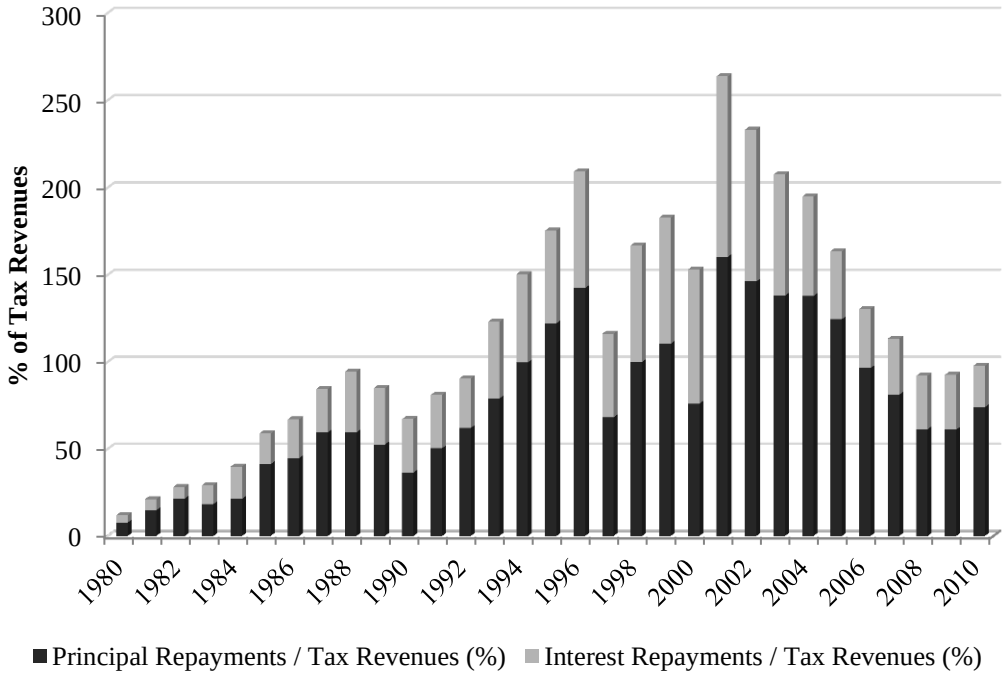


Figure 5: Primary Repayments and Interest Repayments on Debt as Percentage of Tax Revenues (%) (1980-2010)

Source: Ministry of Development (database), Economic and Social Indicators (1950-2010), 2012

Figure 5 displays the ratio of primary and interest repayments as percentage of the tax revenues for the period 1980-2011. The initial observation is that from 1980 onwards, the tax revenues were outstripped by the debt repayment liability of the government. Whereas in the first half of the period principal payments had been the major burden, interest payments had also become noticeable at the end of the 1990's in line with the surge in interest rates. At the eve of 1994 crisis the debt servicing requirements exceeded the revenue generation capacity of the economy and the relevant ratio remained above 100% until 2007.

These figures are in particular important in understanding the inefficient utilization of tax revenues in Turkey. The practice of exploiting tax revenues to finance debt liabilities causes the crowding out of resources that could otherwise have been used for welfare enhancing purposes. Roughly from the beginning of 1990's, this has been the case in Turkey and the policy had inevitable consequences in terms of intergenerational equality. It is evident that the accumulated debt burden and the incidence of tax hump had fallen on the generation after 2001. These generations were not only faced with the repayment of existing debt stock and the interest attached but also had to cope with the primary balance pressure.

Although the principal and interest repayments seem to have been moderated in the past few years, the primary balance pressure continues. Some authors argue that creating primary surplus is a necessary condition for fiscal sustainability especially in heavily indebted countries for that it is a clear indication of the government's commitment to reach the pre-defined targets (Gürdal and Yardımcıoğlu, 2005). On the other side there are views suggesting that a fiscal policy that builds upon generating primary balance hampers the socially beneficial distribution of resources (Öztürk, 2004). It is denoted by some others that the Turkish primary balance target is way too high, lacks economic rationale and is just a negotiation tool for the Turkish government.

It is obvious that the budgetary position had not been restored only by the tax base. The non-tax revenues of the government had significantly increased in this period nonetheless, as a preliminary observation we can suggest that if this study had taken 2002 as the base year then the generational accounts had been significantly different, suggesting a higher burden on the future generations.

As to summarize the preceding discussions, we can say that the 1994 fiscal measures had been an initial and impactful first step in dealing with the chronic problems of the Turkish fiscal system. Except for the adverse economic conditions in 1997 and 2009 as well the internal stringencies in 2001 and 2009, the economy had been successful in mediating the budget deficit. The public sector borrowing requirement had also been improved however the interest payments continue to constitute a burden on the budget. As discussed in detail, the economy has managed to create primary surplus however the concerns regarding the tax efficiency and the crowding out of social investments is still an issue that needs to be handled. The government's efforts to create non-tax revenues through unplanned and unjustified privatisation remains as a major concern especially for the long term sustainability of the economy. In spite of the on-going problems and vulnerabilities, as of 2011 Turkey appears to outperform 18 EU countries and the US in debt/GDP ratio and 14 EU countries and the US in deficit/GDP ratio (see Figure 6 and Figure 7)

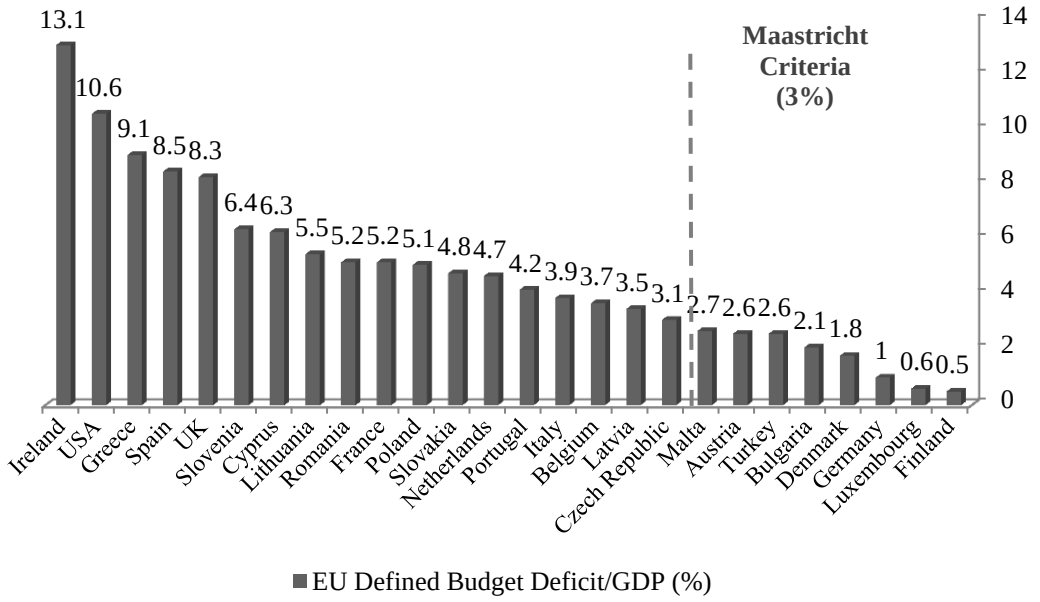


Figure 6: EU Defined Budget Deficit/GDP Ratios for Selected Countries (2011)[13]

Source: Eurostat News Release-Provision of Deficit and Debt Data for 2011, Undersecretariat of Treasury (database)

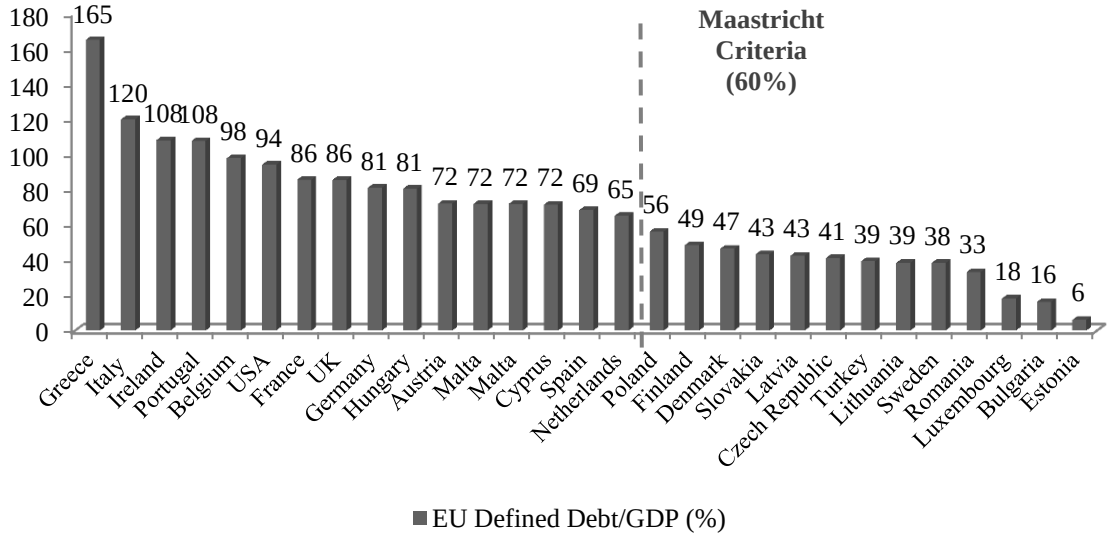


Figure 7: EU Defined Debt/GDP Ratios for Selected Countries (2011)

Source: Eurostat News Release-Provision of Deficit and Debt Data for 2011; Undersecretariat of Turkey (database), Public Finance Statistics, 2012; Ministry of Economics (Confidential)

[13] Sweden, Estonia and Hungary generated budget surpluses of 0.3, 1.0 and 4.3 respectively in 2011. Argentine's, Brazil's and Mexico's budget deficit and debt figures are excluded since these countries do not announce comparable EU defined statistics. USA and Turkish figures are based upon the author's own calculation.

CHAPTER
4

FUNDAMENTALS OF THE TURKISH TAX, TRANSFER AND SOCIAL SECURITY SYSTEM

This chapter will present the legal framework and the distributional aspects of the Turkish tax, transfer and social security system. In this respect, the income structure of Turkish households will be of special interest since it constitutes the foundation not only for the income tax calculation but also for the scheming of indirect tax items. The social security system and the reforms in progress will also be explained in detail since the amendments in the relevant code have the potential to alter the intergenerational distribution of fiscal burden in the long run. Throughout, the discussions and criticisms about the fiscal structure will be presented and evaluated.

The chapter will be concluded after a comparison of Turkish fiscal aggregates with the countries that have been analysed from the viewpoint of GA. The choice is not arbitrary since most of these countries are OECD, EU or BRICS members, which are in general assumed to be comparable to Turkey.

4.1 Turkish Tax System

4.1.1 The Legal Framework and the Distribution of Taxes

According to the Public Financial Management and Control Law, general government budget consists of three main parts: the central government budget which typically comprises more than 90% of the general budget, the social security institutions and the budget of local administrations. Tax revenues which is one of the primary concerns of this study account for 80.2% of the central government revenues for the base year 2008 thus it will be meaningful to examine the revenue items one by one.

Tax revenues are derived from two major sources; direct taxes which are collected from the income, wealth or property of natural and legal persons and indirect taxes which are levied on consumption, expenditure, privilege or right of such natural and legal entities. While income and corporate tax comprise larger share of the direct tax revenues, domestic value added tax, special consumption tax and value added tax on imports account for the major portion of the indirect tax receipts. Before moving on to the detailed analysis of sub-items, it is essential to emphasize that the Turkish fiscal system is way too complicated compared to a number of EU and OECD countries. Apart from the frequent and unjustified changes in the legal framework due to political priorities and populist policies, scale and scope of tax exemptions, repeated amnesties and various allowances make the whole system even more difficult to trace and analyse. Keeping that in mind one should evaluate the rest of the chapter as an informative and introductory summary that aims to provide a basis for the calculations carried out in Chapter 4.

Income tax, being one of the largest direct tax receipt items, is the amount levied on natural persons' worldwide income derived from wages and salaries, business and agricultural profits, independent personal services, immovable property and rights, movable properties and other earnings not classified elsewhere. There are different liability specifications regarding the natives and the foreigners (i.e. limited and unlimited tax liability) however there is no need to dwell further on the details since our data is restricted to residents.

Salaries and wages, which constitute more than 40% of the total income receipts, are legally defined as payments received in return for dependent personal service and they encompass all receipts in cash as well as gratuities, commissions, premiums, allowances and bonuses.

The taxable amount on salary and wage earnings is calculated after deducting the pension, insurance and labour union membership expenditures from the gross receipt.

Entrepreneurial income which is classified as agricultural or non-agricultural according to the nature of the activity constitutes the second largest source of income revenue. The relevant code[14] defines agricultural income as the earnings sourced from activities such as fishing, hunting, breeding, cultivating, culture refining and maintenance performed on land, sea, lakes and rivers. In gross figures, revenues gathered from the sale of final agricultural products and fixed assets plus leasing earnings constitute the taxable base. In order to prevent double taxation, payments for inputs and various items that have been used in the process of production are deducted from this gross sum.

The first non-agricultural income category is the business profits which are defined as any continuous profit accruing from commercial and industrial activity. The nature and scope of these activities as well as tax deductibles are listed in the Article 37 of the Commercial Law and it is to be emphasized that both the amount and the percentage of tax applied on these receipts depend on a myriad of criteria.

The second non-agricultural entrepreneurial income is the one gathered from independent professional service. The term stands for lawyers, accountants, doctors, consultants and engineers who are categorized as self-employed and derive their income out of managerial and scientific expertise. Taxable base for independent professionals is calculated after the deduction of retirement payments, occupational equipment expenses, vocational taxes, payments made for occupational organizations and miscellaneous income items.

Income sourced from real properties, permanent leasehold rights, ships, boats, aircrafts and other transportation vehicles are evaluated as immovable property income. The net income accruing from these properties are calculated after the deduction of maintenance, management, renovation and running, and depreciation expenses. Receipts of capital gains such as interest, rent and dividend are regarded as income from movable property and taxed according to the procedures outlined in the relevant code.

Regarding the income tax items, two points needs to be emphasized especially to clarify the calculations in Chapter 4. First of all one should keep in mind that the definitions provided

[14] The Income Tax Code

above just outline the basic framework and there are further specifications that needs to be considered while determining the type of earning. For instance, in broad terms a lawyer is evaluated as an independent professional and taxed accordingly however if he is the insured worker of a law firm than he is considered to be a wage earner. A physician admitting patients at his office is regarded as self-employed but then the income he makes while working in a private hospital is considered to be a salary. As obvious, depending on these specifications both the legal status and the tax liability will differ drastically hence all details in the budget survey should carefully be used and matched in order not to cause miscalculation.

Secondly, no matter how meticulous one is in the calculations, there are details that cannot be accounted for. The taxation of agricultural income for instance comes with a number of technical specifications. For instance, whether the lump sum or the actual basis will be utilized depends on the size of the enterprise. Moreover, according to the type of the activity different allowances and exemptions apply. Likewise agricultural income, the amount of income tax gathered and the tax methodology utilized differs drastically according to the size of the enterprise in case of business profits. Thus by simply knowing how much net income is earned through these activities and having no informative detail, one cannot accurately estimate the tax revenue.

Table 3 displays the distribution of Turkish households' income for the period between 2006 and 2010[15]. Initial observation is that on average 77.3% of household income is gathered from sources that are legally subjected to taxation whereas 22.7% is gathered from social and inter-household transfers and other income sources.

Throughout the five year period there had been an increase in the share of wage and salary earnings whereas the share of entrepreneurial activity have declined steadily. The five years decline in the agricultural income is indeed part of a much longer and older trend and it represents the transformation of the Turkish economy and the labour market from agriculture dominated one to a service oriented structure. The decline in the non-agricultural income, on the other hand, is not that straightforward to interpret.

[15] The last of the Income Distribution and Life Conditions Survey dates back to 2010.

Table 3: Distribution of Income by Type (1994, 2002, 2006-2010)

Income Type	1994	2002	2006	2007	2008	2009	2010
Wage and salary	23.7	35.8	40.8	39.7	41.9	42.9	43.7
Casual	4.6	2.9	3.7	4.0	4.1	3.5	3.6
Entrepreneurial	42.4	34.5	24.2	23.2	22.4	20.4	20.2
Agricultural	16.7	13.2	7.1	6.4	6.2	5.4	6.3
Non-agricultural	25.7	21.3	17.1	16.8	16.1	15.0	13.8
Rental income	11.6	4.4	3.1	4.1	4.4	5.0	4.2
Property income	7.7	4.9	6.1	7.0	4.2	5.3	4.5
Social transfers	10.0	17.5	17.8	18.2	19.1	19.6	20.5
Pensions and survivors' benefits	-	-	16.9	17.0	18.1	18.3	18.6
Other social transfers	-	-	0.9	1.1	1.1	1.3	1.8
Inter-household transfers *(Received)*	-	-	2.9	2.6	3.1	3.1	3.1
Other incomes	-	-	1.5	1.1	0.9	0.2	0.2

Source: Turkish Statistical Institute (database), Household Consumption Expenditure Survey, 1994; Household Budget Survey, 2002; Income Distribution and Life Conditions Survey, 2006-2010

Table 4 displays the tax brackets and the rates for the year 2012. Until the abolishment of the Article No 5479-1 of the Income Tax Law in 2006, a five point tax cut was granted to wage earners. Between 2006 and 2009 the tax rate had been applied homogeneously regardless of the income type and it was only the lump sum aggregates that changed (reword). In 2010, as part of the fiscal reform, the upper limit of the third income bracket and the lower limit of the fourth (highest) income bracket have been levelled up for wage earners. In current practice, the income tax is differentiated among four brackets and the relevant rates are applied at 15%, 20%, 27% and 35% respectively.

Table 4: Income Tax Brackets for 2012

Tax Bracket	Tax Rate	Revenue
Up to 10,000 TL	15%	15% of Income
10,000 TL-25,000 TL	20%	1,500 TL + 20% (Income-10,000 TL)
25,000 TL-58,000 TL*	27%	4,500 TL + 27% (Income-25,000 TL)
Above 58,000 TL**	35%	13,410 TL + 35% (Income-58,000 TL)

(*) 25,000 TL – 88,000 TL, 4,500 TL + 27% of (Income-25,000 TL) for wage earnings

(**) Above 88,000 TL, 21,510 TL+35% of (Income-88,000 TL) for wage earnings

Source: Revenue Administration (database), Tax Statistics

There had been controversial views about the ultimate impact of this policy on the revenue structure and the tax equality, major criticism being that the amendment did not aim to relieve the tax burden of low and middle income wage earners but instead benefited the high

income minority. Moreover it was argued that the policy concerned only a minor portion of the population. Observing the Table 5 figures, one notices that almost a quarter of the total income is generated by the highest quintile of wage and salary earners. Hence any policy that aims to modify and improve the tax structure should definitely target this class. It is true that the ultimate effect of widening the tax bracket is ambiguous; but knowing that Turkey is one country that have continuously increased the tax rates but failed to increase the revenue simultaneously, the practice can be decrease revenues as well[16].

Table 5: Distribution of Income by Type and Quintile for 2006-2010, Period Average

Income Type	**1st 20%**	**2nd 20%**	**3rd 20%**	**4th 20%**	**5th 20%**
Wage and salary	1.1	3.4	6.1	9.7	22.6
Casual	1.0	1.1	0.8	0.6	0.3
Entrepreneurial	1.3	2.2	2.7	3.5	11.3
Agricultural	0.8	1.0	1.1	1.2	2,0
Non-agricultural	0.4	1.1	1.5	2.3	9,1
Rental income	0.1	0.1	0.3	0.8	3.0
Property income	0.2	0.4	0.4	1.0	2.8
Social transfers	0.7	1.6	3.3	5.1	9.1
Pensions and survivors' benefits	0.4	1.4	3.2	4.8	8,5
Other social transfers	0.2	0.2	0.2	0.2	0,4
Inter-household transfers *(Received)*	0.3	0.4	0.5	0.7	1.1
Other incomes	0.2	0.2	0.2	0.0	0.1

Source: Turkish Statistical Institute (database), Income Distribution and Life Conditions Survey, 2006-2010

The second largest direct tax item is the corporate tax which is regulated under the Corporate Tax Law and is applied to domestic and foreign capital companies, cooperatives, public enterprises and joint ventures. In line with the economic priorities and harmonization of the tax system with the EU standards, the corporate tax rate has been reduced gradually. The 46% rate that had been applied between the years 1986-1993 was reduced to 25% in 1994 however a withholding tax of either 10% or 20% was started to be charged depending on whether the firm is open to public or not. In 2004 the corporate tax was increased to 33% from its 1999 level of %30. Then in line with the fiscal restructuring it was reduced to 30%

[16] Estimating the effect of an increase in the tax revenue incurred from the highest bracket will be one of the policy experimentations in Chapter 5. However, since we cannot know the ultimate behavioral response to an increase in the tax rates in a partial equilibrium framework, we shall not investigate how the bracket should be adjusted. The desired increase can be reaced either thorugh an increase or a cut in the relevant rate, specifics of which depend on the tax morale and constitute a different stream of research. Yet the results from such a study would be very insightful for the pusposes of this paper.

in 2005 and finally to 20% in 2006[17]. Turkey has adopted this reduction partly to increase foreign direct investment and partly to comply with the EU standards. EU tax code require the member countries' corporate tax rates to be compatible in order to ensure and sustain competition amongst. Currently the Turkish corporate tax rate is within the upper and lower level determined by the Union and it is the lowest among all member countries.

Succession duty is the tax levied on the acquired property whose ownership has changed upon the death of the former owner or voluntary transfer from one person to another. Motor vehicle tax is gathered from real and legal persons upon their ownership of motor vehicles which are defined in the relevant code. These two together are considered as property taxes and they constitute a rather small share of the direct tax revenues.

The second broad tax category in the budget is the indirect taxes, major portion of which is generated by VAT and SCT. Domestic VAT, enacted in 1985, is an advanced form of consumption tax which typically puts the tax burden on the end consumer. Although the VAT rate for Turkey is predetermined at the 18% level, 1% applies for items listed in List No I (agricultural products, newspapers…etc.) and 8% applies for deliveries and services mentioned in List No II. The share of domestic VAT in total tax revenues has realized as 17.7 % on average between the years 1985-2011 while the share of import VAT goods has been 13.1%.[18]

SCT, introduced in 2002 to harmonize the Turkish tax system with that of the European Union's, is an excise tax levied on luxury and demerit goods. SCT, taken on a specific or ad volarem basis, applies for (1) petroleum products, natural gas, solvents, derivatives of solvents, lubricating oil, (2) automobiles, motorcycles, planes, helicopters, yachts (3) alcoholic beverages, cola, tobacco and tobacco products and (4) various luxury items. Although the aim of these taxes is to create positive social externality rather than collecting tax revenue, the statistics reveal that SCT has been a very significant revenue item since it has been enacted. Unlike VAT, SCT is a one-time tax and the bearer of the tax burden is specified in the relevant code.

[17] www.gib.com.tr, Revenue Administration website database.
[18] These figures are obtained from the Revenue Administration database. It is to be noted that there is a discrepancy between these numbers and the ones provided by the Ministry of Finance. This deviation is due to the inclusion of local administration budgets and tax allowances for the years 2006-2011.

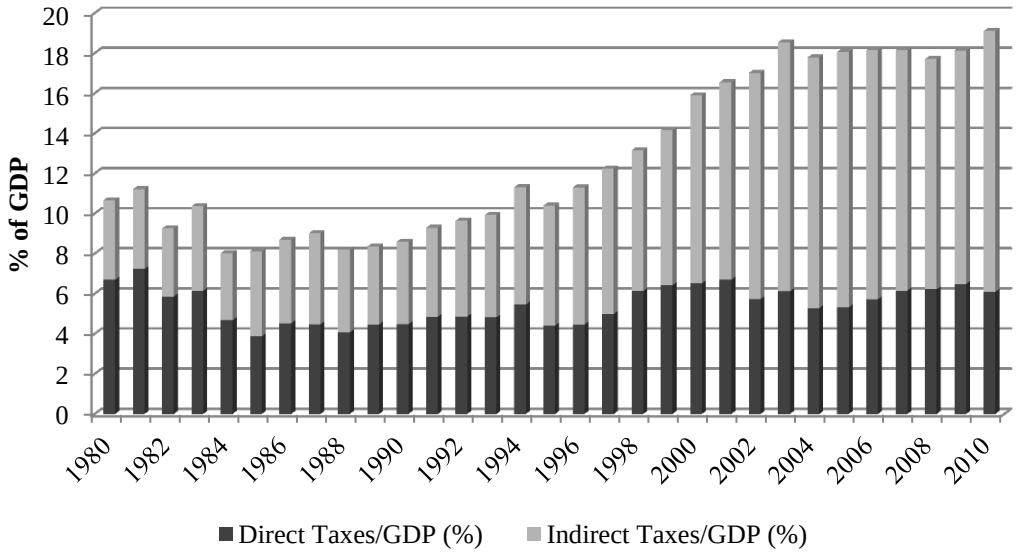


Figure 8: Direct and Indirect Taxes as Percentage of GDP (%) (1980-2010)

Source: Ministry of Development (database), Economic and Social Indicators (1950-2010), 2012

Figure 8 shows the percentage share of direct and indirect taxes in the GDP. The initial observation is that, Turkey has been successful in increasing the tax revenue from 1980 onwards however this was reached mainly by the virtue of indirect taxation. In spite of the rising GDP and living standards, the share of direct taxes as remained roughly unchanged, while the share of indirect taxes more than tripled. The inherent problem of structure shall be discussed as part of the following arguments.

4.1.2 Problems of the Turkish Tax System

The Turkish tax system has many structural problems, namely informality, horizontal and vertical inequality, regressivity of the tax scheme, lack of inspection and heavy reliance on indirect taxes. From a critical standpoint all these problems may be evaluated as interlinked to one another.

There is no consensus on the size and the scope of informal economy. Studies by Çetintaş and Vergil (2003), Savaşan (2003), Karanfil and Özkaya (2007), (2007), Davutyan (2008), Yurdakul (2008) and Erkuş and Karagöz (2009) find evidence of varying degrees of informality ranging from 0% to 50% of GDP. The general idea is that informal economy is almost as large as half the size of formal economy.

The most crucial problem regarding informality is that it narrows the taxable base and the primary surplus. The government needs to resort to excessive borrowing and enhanced taxation in order to compensate for the loss in the tax revenue, a situation which creates higher per capita tax burdens for the population employed in the formal sector. Consequently, both the employers and the employees switch to informal sector and the economy is trapped in a vicious cycle.

Another problem, very much related to the first one is that in countries where the share of informal economy is large and the tax avoidance behavior is ubiquitous, governments base the tax system on indirect taxes which are typically easier to collect (from the perspective of the government) and more difficult to evade (from the perspective of taxpayers). However, indirect taxes are not suitable for differentiation and they are regressive in nature. Typically, consumption goods constitute a larger share of the low income population's budget compared to the high income group. Hence once the same amount of indirect tax is levied regardless of the level of income, the former is more adversely affected by the policy, a situation which distorts vertical tax equality.

Horizontal inequality is another frequently underlined problem of the system. The tax allowance and exemption regulations in the Turkish code results in a tax inequality among those who are classified in the same bracket.

Last but not least is the lack of prudent inspection and monitoring. Aslan (2002) denotes that only 2% of the accounts are annually inspected by the Ministry of Finance, which is an exceedingly insufficient amount.

4.2 Turkish Transfer System

Transfers are legally defined as unrequited payments made to households. Being welfare-enhancing in nature, they are not distributed in exchange for any good or service and they are extended to support households with their education, health, employment, sustenance, old age and family related needs. The Turkish budgetary system makes a rather complicated and somewhat "covert" classification of the transfer payments, details of which should be analysed rigorously for the purposes of this study.

The 1973-2003 consolidated budget which was organized according to the program budget classification aggregated interest payments, SEE capital and duty losses, tax rebates and social security payments as transfers. The largest transfer item in this categorization was the debit interest payments that included bond interests, bill interests, short term advance payments and the interest on external debt. The 2004-2005 consolidated budgets which were organized according to the analytical budget classification[19] on the other hand, classified interest payments as a separate item. The major transfer items in the consolidated budget were duty losses of SEE's, Social Security Institution, retirement funds and financial institutions, treasury aids to local administrations, autonomous institutions and funds, transfers to non-profit organizations-mainly to political parties, transfers to households[20] in the form of agricultural supports and tax rebates and transfers abroad. Although the main frame of the budget and the "Current Transfer" items have been preserved since 2004, 2006-2011 figures are presented for consistency. Table 6 displays the share of various transfer items as percentage of GDP.

Table 6: Transfer Payments as Percentage of Budget Expenditures (2006-2011)

	2006	**2007**	**2008**	**2009**	**2010**	**2011**
Current Transfers	**28.90**	**31.0**	**31.0**	**34.3**	**34.6**	**35.1**
Duty Losses	4.1	4.2	4.2	6.1	5.6	6.4
Treasury Aids	12.2	14.2	13.7	16.6	16.0	14.0
Transfers to Non-Profit Institutions	0.1	0.3	0.2	0.3	0.4	0.4
Transfers to Households	3.3	3.5	3.6	2.9	3.3	4.1
Transfers Abroad	0.3	0.2	0.3	0.3	0.3	0.4
Other Transfers	7.9	8.4	8.9	8.0	8.9	9.8

Source: Ministry of Finance (database), Budget Figures and Budget Realizations, 2012

[19] Turkey's budget code was harmonized with the Government Fiscal Statiscits of USA and ESA'95 of the European Union from 2004 onwards with the combined efforts of IMF and local authorities. From that year onwards, analytical budget classification is used. Retrieved August 15, http://www.bumko.gov.tr/PEB/Genel/

[20] Transfers distributed by the Turkish government are grants and bursaries extended to citizens and non-citizens, transfers for health care, sustenance, housing and social purposes, old age, disability and family benefits and agricultural supports.

Table 7: Transfer Payments as Percentage of GDP (2006-2011)

	2006	2007	2008	2009	2010	2011
Current Transfers	**6.5**	**7.2**	**7.3**	**9.2**	**9.3**	**8.56**
Duty Losses	0.7	0.8	1.0	1.7	1.6	1.6
Treasury Aids	2.9	3.4	3.3	3.9	4.5	3.4
Transfers to Non-Profit Institutions	0.0	0.1	0.0	0.1	0.1	0.1
Transfers to Households	0.9	0.8	0.8	0.8	0.9	1.0
Transfers Abroad	0.8	0.1	0.1	0.1	0.1	0.1
Other Transfers	1.9	2.0	2.0	2.6	2.1	2.4

Source: Ministry of Finance (database), Budget Figures and Budget Realizations, 2012

Figures show that "Current Transfers" constitute more than 30% of the budget expenditures and on average 8% of the GDP yet only a minor share is directly transferred to the households. Figures also show that in 2009, the share of transfers have been increased by 26% which can partially be explained by government's effort to compensate for the losses caused by the crisis and partly by the fact that GDP growth slowed down.

Transfers that have been reduced due to the favourable economic conditions of the year 2008 were increased throughout the 2009 crisis and continued to increase thereafter for the two consecutive years.

Transfer to household accounted for only 0.1% of the GDP in year 2011 which might seem exceedingly low especially when one considers the multitude of purposes that these transfer payments should serve. However, the de facto amount transferred to the households is much higher than what has been suggested by these numbers. The reason why we cannot see all the transfers accurately is that payment/receipts balance of the social security system and other institutions are not explicit in the central budget. Instead, only the aggregated budget transfer figures are presented. We shall reemphasize this point and the computational difficulty arising from such practice in Chapter 5 but for the time being, we can conclude that there is a budget overshadowing in the Turkish system. It is difficult to estimate the amount of transfers received by the individuals without sourcing information from self-declarations and micro level budget and consumption data.

4.3 Turkish Social Security System

Social security, in the very broad sense refers to the public measures taken by the government to protect its members against the risk of economic or social distress and to provide them with medical care, old age, maternity, child and family benefits (ILO, 2009).

There are two major social security systems in the world; the fully funded (defined-contribution) scheme that requires individuals to make their own contribution very much similar to private saving and the pay-as-you-go system (defined benefit) that rests on the principal of intergenerational transfer where worker's contributions are allocated to those who are retired. Both systems have their merits and drawbacks. While the fully funded system is way disposed to inflationary erosion and typically covers a limited part of the population, the pay- as-you-go system ends up crowding out private savings and eventually reduces the gross national product. Moreover the system becomes unsustainable if the population is ageing.

The choice between these two systems is an issue of on-going debate, details of which will not be discussed in depth in this chapter however it is to be emphasized that this is one of the most crucial line of fiscal scrutiny and will be discoursed in great length in the upcoming years, regarding the social security reform plans in hand. We shall leave the discussion aside by finally remarking that Turkey has an extensive pay-as-you-go system that goes hand in hand with the individual retirement plan[21].

In order to understand the on-going reform acts and to comprehend which measures need to be taken to stabilize the distorted social security balances, one should have a brief look at the near history and the recent developments in the relevant scheme.

The initiation of a modern social security system dates back to 1945, making the Turkish system one of the youngest among EU countries. Until their unification in 2006 (de facto in 2008), Turkey had adhered to a tripartite social security structure comprised of the Turkish Republic Retirement Chest (ES) founded in 1945 for public employees, Social Security Institution (SSK) founded in 1945 for workers and Social Security Organization for Artisans and the Self-Employed (BAĞKUR) founded in 1971. Besides the occupational segregation of social security, the legal framework, eligibility criteria and the extent of benefits had been different for these three funding schemes.

[21] As part of the government's attempts to increase domestic saving, in June 29, 2012 the individual retirement system have been amended. The new system abolished the practice of taxable income deduction in the form of tax advantage and introduced the government contribution scheme. With the new act, for each 100 TL contribution of the tax payer, government commits to make a contribution of 25 TL. The upper bound of this contribution, allowances and details are explained in No: 28338 of Official Register. The aim of the plan is increase the social security coverage of the country and to increase the domestic saving from its period low level of 12.7%.

As denoted by a number of authors, despite its short life span, the Turkish social security system has accumulated a number of structural problems that calls for urgent reform action. After being operative between 1945 and1980, the active/passive balance of the system which should be 1 to 4 for a functioning system (Gümüş, 2010) started to deteriorate gradually (see Table 8). Since the number of pensioners outweighed the number of active workers, contributions failed to compensate for the benefits hence large funding deficits were generated in the system. Social Security Specialty Commission Report (2007) prepared by the State Planning Organization denoted that between 1994 and 2004 the government resorted to excessive borrowing in order to recompense for the social security deficits. Report underlines that the total resources transferred from the budget to meet the relevant deficits amounted to 475 million TL, an amount almost equivalent to the GDP of 2004.

Table 8: Active/Passive Balance of the Social Security System and the Coverage Rate (1980-20011)

	Active/Passive Ration				Coverage
	ES	SSK	BAĞKUR	Total	
1980	2,92	3,47	7,96	3,80	46,48
1985	2,34	2,44	5,71	2,91	54,60
1990	2,21	2,06	3,30	2,35	66,27
1995	1,97	1,80	2,03	1,88	76,77
2000	1,49	1,58	1,74	1,60	68,18
2001	1,48	1,38	1,64	1,45	67,93
2002	1,51	1,40	1,57	1,46	69,84
2003	1,47	1,44	1,57	1,47	71,57
2004	1,40	1,51	1,46	1,47	73,70
2005	1,35	1,62	1,31	1,49	76,04
2006	1,31	1,75	1,19	1,53	78,39
2007	1,29	1,80	1,13	1,54	79,71
2008	1,26	1,76	0,97	1,48	79,83
2009	1,25	1,71	0,88	1,43	80,39
2010	1,25	1,71	0,88	1,43	83,40
2011	1,25	1,71	0,88	1,43	85,01

Source: Ministry of Development (database), Economic and Social Indicators (1950-2010), 2012; Social Security Institution Monthly Bulletin

One of the major problems of the social security system has been the informality in the labour market. Compared to OECD and EU countries, the tax wedge, namely the difference between gross and the net receipts is significantly high in Turkey. This indicates that both the employers and the workers are faced with an excessive tax burden which in return creates an incentive for the labour force to switch to informal employment. While the formal

employment thus the taxable share of the population narrows down, government exerts more pressure on the formally employed. As taxes surge, informal sector grows causing a vicious circle. As part of the "Fight against the Informal Economy" action plan, the government had extensively monitored the labour market and identified informal employment. Moreover with the amendment in the Act No: 5510 (81), the employer's social security contribution has been lowered by 5% in 2008. The minimum living allowance aimed to attenuate the tax burden on workers. All these have been important in narrowing the tax wedge and increasing the coverage rate in the social security system.

Another frequently underlined problem of the system is the inequality created by the recurrent amendments regarding the pensionable age. Before 1981 the eligibility criteria to qualify for old age pension was not the age but the sufficiency of premium payments hence the system enabled women and men to retire as early as 38 and 43, respectively. Although the act has been revised from that year onwards[22], this practice has created a hump on the current generations[23] (see Chapter 4 for further discussion). Harmonization of the social security system in terms of pensionable age is one of the top priority policy actions in the reform agenda. Amendment in the Act No: 4447 had raised this requirement to 58 for women and 60 for men. Moreover the law anticipated a gradual increase from the year 2035 onwards and equalization among genders at 65 by the year 2045. However taking the size of pensioner pool into account one can say that the social security system is likely to generate deficits at least in the foreseeable future.

Another structural problem of the social security system had been the lack of norm and unity among the three institutions, ES, SSK and BAĞKUR. The difference between the legal framework, the benefits attached and the requirements of these three funding schemes had created horizontal inequality among the labour force. In general, public servants had been the most advantaged group with generous old age and health care benefits whereas BAĞKUR pensioners were the most underprivileged. In addition to the inequality problem

[22] Just from 1950 to 1999 there had been seven amendments regarding the pension eligibility criteria (Social Security Specialty Commission Report, 2007). The last one in particular received considerable public controversy since the pensionable age for men were set as high as 60 with this amendment while the life expectancy for a male born in 2000 was on average 66.8 (Lopez, Ahmad, Guillot, Inoue, Ferguson and Salomon, 2001), a situation which contradicts with all the life cycle assumptions regarding social security.

[23] In line with the increase in life expectancy, pensionable ages are being revised in almost all countries however it is also true that such changes make structural breaks among generations and create intergenerational inequality.

created by the system, the lack of coordination among three had the whole system exceedingly difficult to trace and monitor. The 2006 (de facto implemented from October, 1 2008 onwards) reform act abolished this segregated structure and founded the Social Security Institution (SGK). The aim of the act had been to equalize the status of all occupational groups at the SSK level. It is way too early to assess the success of the reform act since there exists a considerable population bounded by the rules and regulations of the old regulation. The full execution of the reform will not be realized until these people leave the system. The Act No: 5510 "Social Securities and the General Health Insurance" can also be considered as a major reform action in improving the quality and the coverage of the health care provided in Turkey. The act has mainly targeted the underprivileged portion of the population who cannot pay for the health services and lack social insurance of any kind.

Despite receiving positive credits, the social security system continues to have structural problems. As noted by Gümüş (2010), distorting the actuarial balance of the system by simply increasing the premium payments and decreasing the benefits is nothing more than a very myopic solution that will have deleterious consequences in the long run. Yet, the reforms are still in progress and the full effect will be realizable only when the individuals subjected to the former laws leave the economy.

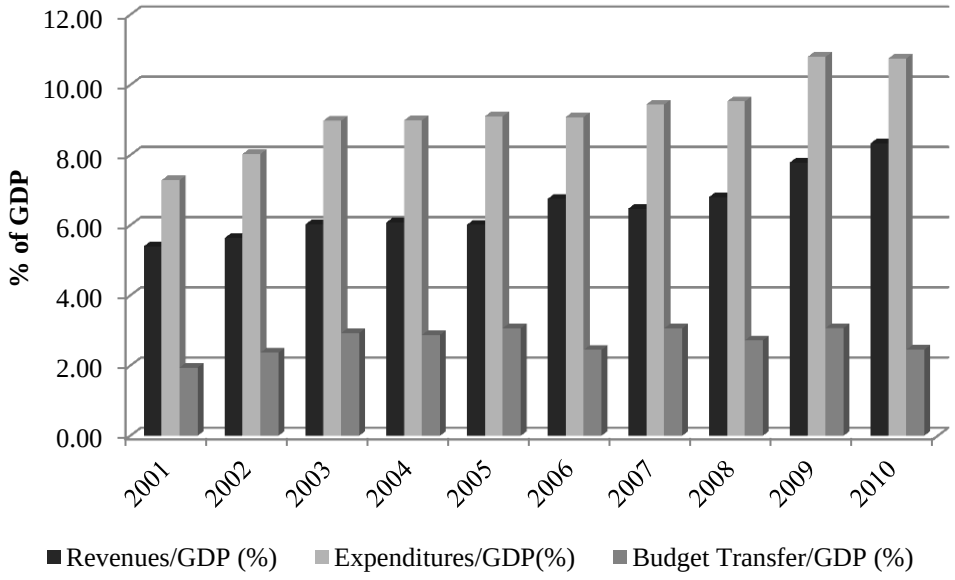


Figure 9: Balances of the Social Security System (%) (2001-2010)

Source: Ministry of Development (database), Economic and Social Indicators (1950-2010), 2012

4.4 A Comparison of the Turkish Fiscal Aggregates with the Selected Countries

As emphasized in the preceding discussions, the GA studies carried out in the late 1990's are not perfectly comparable to the results of this study. However it is essential to uncover the fiscal stance of major countries in order to interpret the direction and the magnitude of the fiscal imbalance suggested by the Turkish generational accounts. Moreover, this kind of a comparative approach will enable us to see the stringency of the Turkish fiscal system.

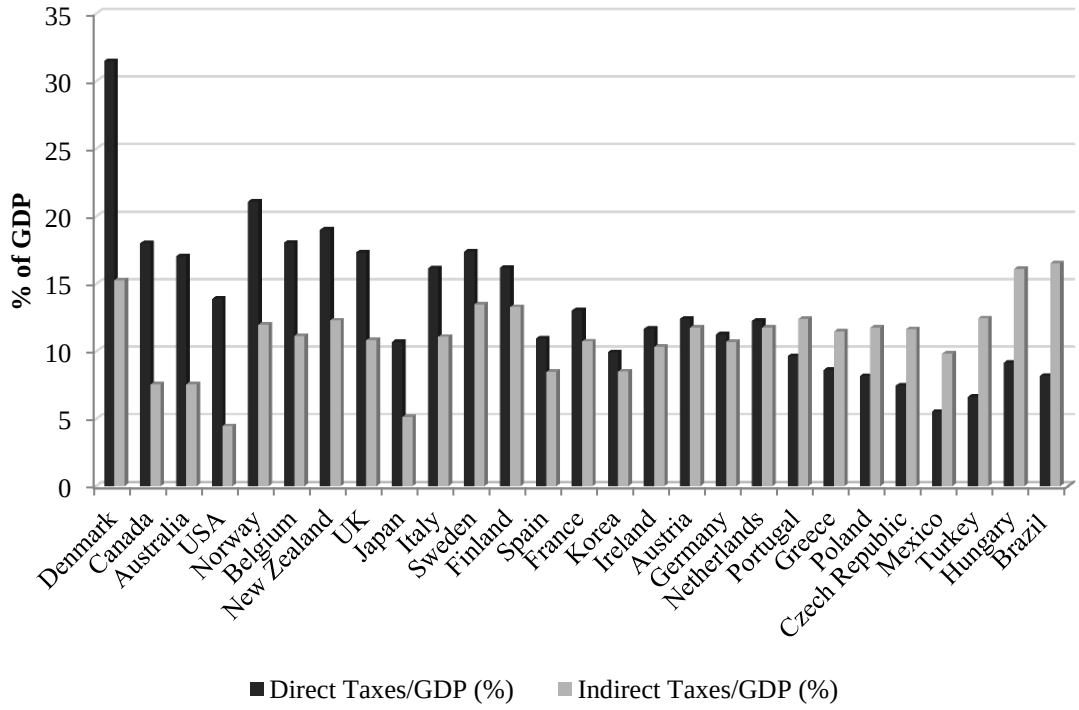


Figure 10: Distribution of Total Tax Revenue as Percentage of GDP for Selected Countries[24] (%) (2010)

Source: OECD Revenue Statistics (database), Comparative Tables, 2012, Brazilian Ministry of Finance (database)

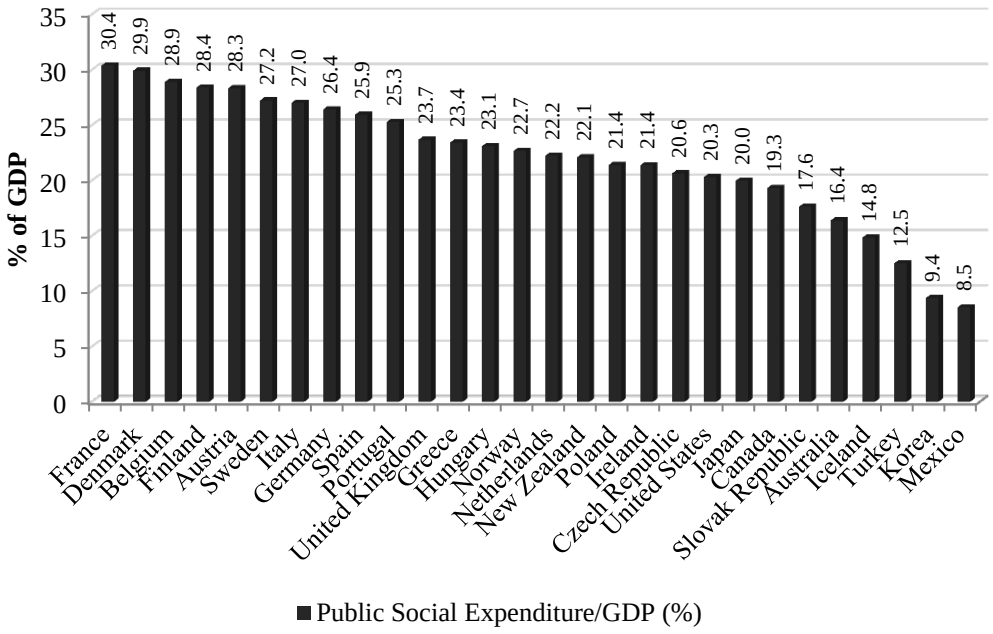
Figure 7 displays the percentage share of direct and indirect taxes in GDP for 27 countries. As apparent, there are large differences between the aggregate tax receipts and the categorical distribution of tax revenue. Denmark, with a total tax revenue to GDP ratio of 42%, ranks the highest tax country among all. Furthermore, the share of direct taxes is incomparably high in Denmark, reaching to more than 30%. It is evident that with the

[24] The countries that have been studied in the GA literature have been selected with the exception of Greece which is an important country to compare to Turkey.

exception of Germany and Netherlands, the countries with high income and standard of living typically resort to taxes as the major source of revenue and direct taxation is preferred. Lower income countries which are traditionally linked with the problems of tax inequality, informality and fiscal abuse on the other hand, appear to raise higher share of their revenue from indirect taxes. Among these 27 countries, Turkey manages to outperform only Mexico in terms of total tax revenue/GDP ratio.

The extent of transfers and social security payments is another important institutional parameter, details of which are compiled in Figure 8. According to the ratio of public social expenditure to GDP statistics, France, Denmark and Germany ranks as the top three. Turkey outperforms Korea which typically has a very small yet functional government and Mexico which has not adopted a distributive system.

Figure 11: Distribution of Public Social Expenditures as Percentage of GDP for Selected Countries (%) (2010)



Source: OECD Revenue Statistics (database), Comparative Tables, 2012

Simply by comparing these figures, one can make qualitative assessment of the fiscal burdens that will be inherited to future generations. For instance, France appears to adopt a very generous social security and transfer system (which was emphasized by Levy and Dore (1999) as well) yet collects less tax revenue compared to a number of continental Europe

country. It is evident that such scheme would threaten the long term fiscal management of the system, especially given the potential threat of ageing population problem. Same problem pertains to Germany, Netherlands, Finland, Belgium, Spain, Austria and Sweden as well. The Turkish fiscal balances on the other hand reveal that the country fails to generate sufficient tax income yet it does not follow a redistributive scheme either. The generational imbalance of 24.3%, which is a much more manageable figure than a lot of countries, is partly achieved by the virtue of this low tax-low transfer nexus.

CHAPTER
5

DATA AND STATISTICS

This chapter presents the data sources and the statistics used in the construction of Turkish generational accounts. As extensively discussed in Chapter 2, the calculation of generational accounts requires the construction of age and gender specific net tax profiles, adoption of coherent and realistic population projections as well as choosing a valid variable that represents the net wealth of the government for a particular base year. Throughout the chapter, the method adopted in the computation of each figure as well as the underlying assumptions will be made explicit. The last section of the chapter will focus on the empirical critics regarding the determination of exogenous variables, accuracy of population projections and the selection of the base year. In this respect, our model's assumptions will be justified.

5.1 Data Sources and a Brief Evaluation

The very first step of generational accounting is to construct age and gender specific tax profiles for a particular year. In order to do so, we have utilized the *"Household Budget Survey"* of 2008 conducted by Turkish Statistical Institute (Turk Stat). Survey contains detailed information about the consumption structure, income sources and income levels of 33,287 individuals from 8640 households and compiles statistics about the employment, union membership, social security status, healthcare benefits, pension payments and miscellaneous transfers for thirteen age categories in a gender specific classification. Despite being comprehensive, budget survey lacks many of the essential variables and details that could have been significant for the purposes of this study, nonetheless such information is approximated from macro aggregates in a reasonably consistent way, details of which will be explained in the upcoming sections.

Statistics about the aggregate budget figures are gathered from Revenue Administration and Ministry of Finance databases. Age and gender specific population statistics and projections for the years 2008-2025 are taken from Turk Stat. These are appended with the "UN Population Prospects" provided for the years 2030, 2035, 2040, 2045 and 2050.

Before presenting the calculations, it is essential to evaluate whether our survey sample is a good representative of the 2008 Turkish population. The first benchmark is provided by the Eurostat's "Comparative EU Statistics on Income and Living Conditions: Issues and Challenges" report that aims to standardize the variables and methodologies for gathering micro level data from EU countries. In the report, the minimum effective household sample size for cross sectional studies are specified as 7250 and 8250 for France and Germany, respectively. Although there is no such figure identified for Turkey, retaining that Turkish population is remains between these two; one can claim that the sufficiency criterion is met. Another yardstick is the demographic structure of the sample. Table 9 summarizes and compares the age and gender specific demographic characteristics for the sample and the population. Statistics reveal that women, individuals younger than 15 and those who are aged above 65 are slightly overrepresented in the sample. When interpreting the results this should be kept in mind as well.

Table 9: Age and Gender Specific Distribution of Individuals in the Sample and the Population

Distribution of Men (%)			Distribution of Women (%)		
Age Interval	**Sample**	**Population**	**Age Interval**	**Sample**	**Population**
0- 4	4.95	4.51	0- 4	4.71	4.31
5-14	8.93	9.16	5-14	8.89	8.75
15-19	4.37	4.42	15-19	4.68	4.20
20-24	2.91	4.46	20-24	4.16	4.30
25-29	3.58	4.64	25-29	4.34	4.53
30-34	3.47	4.07	30-34	3.91	3.97
35-39	3.75	3.72	35-39	3.94	3.68
40-44	3.28	3.32	40-44	3.67	3.24
45-49	3.25	2.98	45-49	3.36	2.96
50-54	2.82	2.52	50-54	2.72	2.51
55-59	2.11	1.95	55-59	2.12	2.00
60-64	1.58	1.41	60-64	1.61	1.59
65+	3.18	2.97	65+	3.67	3.84
Total	**48.21**	**50.13**	**Total**	**51.79**	**49.87**

Source: Turk Stat (database), Population Statistics

Although the demographic characteristics are compatible, survey based statistics deviate significantly from the key aggregate accounts; a problem that needs to be justified on a reasonable basis.

First of all it is evident that dealing with micro level data involves problems whatever county and whichever macro variable is dealt with. This has been emphasized in the literature quite often and it will be beneficial to quote some of these concerns, especially the ones relevant to this study. In their analysis of the life cycle saving model for six developed countries, Börsch-Supan and Lusardi (2002) state that saving statistics obtained from micro level data is inconsistent with the aggregate figures due to unrealized capital gains. The same problem exists for Turkish budget surveys as well. Since we can only account for the traditional sources of annual income but cannot grasp the changes in the household wealth, the understatement of income is quite expected. Studying the relative consumption and budget profiles of the newly emerging countries China and India, Chaudhuri and Ravallion (2006) underline the discrepancy between survey based statistics and the national account figures. They indicate corporate and public portion, namely the *non-household portion* of domestic absorption as an explanation for the GDP differences which indeed is a reasonable

defence. Heterogeneity among the population, incalculable income inequalities, sample selection bias are ubiquitously emphasized problems mainly specific to the studies in African and Latin American countries. Apart from these major statistical problems, volitional underreporting and misrepresentation are inevitable data problems specific to micro level studies. Against all limitations, household surveys can provide valuable information about the population under valid assumptions.

The second problem which is the lack of transparency and consistency among budget statistics has already been mentioned in the literature review part in quiet detail. The problem constituted the starting point of the debates about fiscal policy and led the foundation of generational accounting methodology as an alternative measure. To concretize the point, for the year 2008, Ministry of Finance reports a total tax receipt of 168 billion TL which corresponds to 80.2% of the total central government revenue. 38 billion TL of this amount is reported as personal income tax while 68.61 billion TL is declared as the sum of Domestic Value Added Tax (VAT) and Special Consumption Tax (SCT). On the other hand, Revenue Administration declares that tax revenues sum up to 189.98 billion TL and they accounts for 84% of the general government revenue. 44.43 billion TL of this amount is labelled as personal income tax and 72 billion TL is the declared sum of VAT and SCT.

The drastic deviation among these two numbers stems from the fact that local administration budgets and fund shares as well as tax disallowances and returns have been added to the central government revenue for the years 2006-2011 and the Revenue Administration prefers to present these gross figures. Ministry of Finance on the other hand reports statistics net of tax disallowances, cost-of-living allowance and returns. Neither the reasoning behind the fiscal change nor the rationale behind presenting different statistics has been justified in any source but it is true that such dilemmas blur the fiscal outlook. They do not only puzzle citizens about the amount of tax they pay but also cause underrated budget deficit figures. Furthermore, the social security system, which can at best be labelled as a “huge fiscal gap” is left outside the central government budget. Exclusion of the social security deficit again represents an undervaluation of the budget deficit. The inherent meaninglessness of the deficit concept is exacerbated by these data manipulation problems.

5.2 Tax, Transfer and Social Security Statistics

To construct the generational accounts we need to calculate the amount of net taxes, in other words the amount of tax paid less transfer received for specific age-gender group. In the literature there are numerous ways to reach these figures but we can broadly categorize them into two classes as the direct (micro level) and the indirect (macro level) calculation methodology.

In US and EU countries where extensive and harmonized micro level data exists, the methodology is to collect tax and transfer figures directly from the personal declarations. Grouping these figures according to gender and age specifications and harnessing them with the population projections, one can get the intergenerational distribution of the government deficit burden. The other stream of methodology which we call indirect or macro based involves countries where national figures are presented with some information on the demographic distribution. This is a rather arbitrary methodology yet it is not invalid to expect that on average what we get from micro and macro variables will more or less converge, provided that we do not have sample selection bias or external validity problem. The nature and availability of Turkish data dictates us to choose a methodology in between these two. The tax and transfer items in the budget survey and the method through which the aggregate figures are obtained will be explained in this chapter.

5.2.1 Taxes

Household Budget Survey provides extensive information about the source and level of household's income. Listed income items are salaries, agricultural income, income from entrepreneurial activity, annual income from immovable property and estates, interest payment receipts from foreign and domestic bank accounts, dividend payments and rents[25].

[25] Salaries represent the net annual income derived from salary, wage and daily fee payments net of pension, social security deductions and taxes. Gratuities, bonuses, premiums, income from extra tasks and expert's fees are classified elsewhere. Tax refunds are recorded under transfer payments. Agricultural income is the annual sum of harvest revenue, increase in the livestock inventory, expenses made for animal products, lease income from agricultural equipment and machinery, income from forestry, fishing and hunting and share cropper's profit less harvest expenses and revenue from animal products. Income from entrepreneurial activity is the net annual disposable (gross revenue less direct taxes and investment expenditures) cash income received by the entrepreneur. Copyright income is included. Income from immovable property is the receipts of renting real estate, commercial space and warehouses.

All income records are annual and net figures hence the initial step is to calculate the gross figures and the relevant tax payments. It is to be emphasized that the calculations can at best be arbitrary since we need to assume a pre-specified tax rate on each income item whereas in reality these vary to the extent that allowances and exemptions apply.

Once the income and tax figures are obtained from raw data, the contribution of each age and gender group is calculated as the ratio of tax payments to the total receipt. These values (the percentage contributions) can be thought as the expected income tax payment of each group[26]. Multiplying these expected values (might be perceived as probabilities as well) with the de facto income tax revenue of 2008, the actual income tax burden of each group is obtained. Per capita tax burden values are achieved by dividing aggregate tax receipts borne by each group to the relevant population figure.

Statistics show that the large share of the income tax is borne by males aged between 45-49 with 2410 TL per individual. As for women, the income tax burden peak is reached within the 35-39 age interval yet the per capita payments are almost one fifth of the male accounts. At first glance, these amounts might seem unacceptably low for annual figures however one should keep in mind that these are not the "tax per taxpayer" but "average tax per individual" figures, meaning that the tax aggregates are homogenously distributed within the age-gender groups, regardless of whether the individual makes an actual payment or not.

The second largest direct tax item in the budget sheet is the corporate tax which amounted to 16 billion TL in 2008. Although it is not the natural but the legal persons such as corporations, joint stock companies and ventures who are liable to pay the corporate tax, this tax liability represents transfer of resources from private hands to those of the public. Thinking it as an amount that could have been distributed to natural persons in the form of profit for instance, the corporate tax burden needs to be considered as a burden as well.

It is to be emphasized that Household Budget Survey does not provide direct information about the corporate tax burden borne by individuals. Henceforth, an arbitrary yet consistent methodology is developed. First, those who own or share an enterprise are filtered from the

---

[26] $p_{ij} = \frac{X_{ij}}{\sum_{j=1}^{11}\sum_{i=1}^{2} X_{ij}}$, $i = m, f \quad j = 1,...,11$ where p_{ij} is the expected income tax contribution of the i^{th} gender and the j^{th} age group given the sample tax payments X_{ij} .

survey sample. Then the records from the same household (spouse ownership) are deleted to prevent repetition and double calculation of corporate tax. Whoever declared a larger income, he or she is regarded as the owner of the enterprise. It is not possible to estimate the firm revenue or the profit however it can be assumed that entrepreneurship income declared by the individuals is a good proxy for the enterprise revenue. Hence, those who own an enterprise and raise entrepreneurial income are ranked and categorized according to age and gender groups[27]. The final step is to calculate the share of each group as a percentage multiplying these percentages with the aggregate corporate tax revenue of 2008.

The Household Budget Survey does not contain information about the consumption expenditures of individuals. If that was so, it could have been much easier and straightforward to get the distribution of excise taxes among age and gender groups. Instead, a different dataset (Household Consumption Survey) with detailed information about how much monthly expenditure has been spent on specific consumption good items have been provided by Turk Stat. One possible approach could have been matching the individual and the household level surveys however this does not provide the information needed; that's because even if the two datasets are stacked flawlessly, one cannot know which specific household member made the recorded expenditure. A rather different approach is developed to overcome the problem in hand.

Instead of utilizing the household level data, the aggregated figures provided by Turk Stat are used. As presented in Table 10, this data compiles information about the distribution of consumption expenditure among income quintiles (income brackets of 20%).

First the individuals in the budget survey are ranked according to their income levels. The tip of the calculation is to take both the regular sources of income (wage, salary…etc.) and the transfer receipts into account because from whatever source the income is gathered from, it enables the individual to make an expenditure. Then this data, which has been ranked in ascending order, is divided into five groups each one representing a quintile. Each of these five groups is differentiated according to age and gender specifics. The rest of the calculation is simplistic and involves stacking this data with the information provided by the consumption figures. Once the sample statistics are revealed, it is easy to distribute various indirect tax items by using the same method utilized in the computation of income and corporate tax.

[27] For spouse ownerships, the co-owner's income is added on that of the lead owner.

Table 10: Distribution of Consumption Expenditure (All Items)

	Income Quintile 1	Income Quintile 2	Income Quintile 3	Income Quintile 4	Income Quintile 5
Food and Non-Alcoholic Bev.	3.1	3.8	4.5	5.1	6.3
Alcoholic Bev. and Tobacco	0.5	0.6	0.8	0.8	1.1
Clothes and Footwear	0.4	0.6	0.9	1.2	2.3
Water, electricity, gas and fuel	2.8	4.4	5.5	6.7	9.6
Furniture and house appliances	0.5	0.8	1.0	1.4	2.2
Health	0.2	0.2	0.3	0.4	0.8
Transportation	0.7	1.5	1.9	3.3	6.7
Communication	0.3	0.6	0.8	1.0	1.6
Cultural Expenses	0.1	0.3	0.4	0.6	1.2
Education Services	0.1	0.1	0.3	0.4	1.1
Restaurants, food services, hotels	0.2	0.5	0.7	1.0	1.9
Miscellaneous goods and services	0.3	0.4	0.6	0.9	1.9
Total Consumption Expenditure	**9.1**	**13.8**	**17.7**	**22.8**	**36.7**

Source: Turk Stat (database), Household Consumption Survey, 2008

Table 11: Distribution of Consumption Expenditure (Selected Items)

	Income Quintile 1	Income Quintile 2	Income Quintile 3	Income Quintile 4	Income Quintile 5
Petroleum and Natural Gas Products	9.56	15.22	18.84	23.19	33.06
Alcoholic Beverages/Tobacco Products/Cola Beverages	13.49	16.61	19.70	22.38	27.82
Motor Vehicles	4.90	10.46	13.84	23.22	47.57
Other	6.50	10.08	15.74	21.36	46.32

Source: Turk Stat (database), Household Consumption Survey, 2008

We shall concretise the relevant calculations by giving a detailed example. In 2008, the revenue gathered from VAT realized as 16.85 billion TL. Roughly 9.1% of this gross amount was born by the individuals in the lowest income quintile whereas 36.7% was paid by the individuals in the highest income bracket. Hence the VAT payments made by the income brackets can be approximated as 1.5, 2.3, 3.0, 3.9 and 6.1 billion TL in ascending order. Adjusting these population aggregates by the sample population figures (each quintile is comprised of 2453 individuals) VAT burden of each group is calculated as 620, 945, 1211, 1561, 2511 million TL. Given the age and the gender specifications, this aggregate burden is distributed among individuals. (See Appendix A for the detailed distribution of tax items among age and gender groups). Different items have been used for the calculation of different taxes. For instance, to compute SCT and the Motor Vehicles tax, the items specified in Table 11 have been utilized. Import VAT (using domestic VAT as a proxy), Communication Tax (using communication expenditures as a proxy), Banking and

Insurance Tax, Gambling Tax, Stamp Duty and Fees (using miscellaneous goods and services as a proxy) are distributed in a similar way. Unfortunately, there is no proxy data to make a valid estimation about the distribution of succession duty among age and gender groups. Assuming that the income and the wealth of the individual are correlated, we have adopted the income distribution pattern to handle succession duty. This is not an invalid assumption and to the extent that succession duty constitutes a very minor share of the tax revenues, the arbitrariness can be tolerated.

Figure 9 and 10 display the cumulative distribution of direct taxes for males and females, respectively. It is observed that in aggregate terms, males between 35-39 bear the highest portion of direct taxes, although males make their peak per capita tax payment between 45-50 (see Table 12). This deviation between the aggregate and the per capita figures stems from the fact that the 35-39 age group is more populous than the 45-50 category (see Appendix A for the detailed distribution of 2008 Turkish population among age and gender groups). Figures suggest that females make the largest aggregate contribution to direct tax revenues between the age 30-34.

While income tax constitutes the highest tax burden on both genders, males are also faced with an excessive payment of the corporate tax as well. Same applies for the motor vehicle taxes whereas succession duty appears to constitute only a negligible share for both genders at all ages.

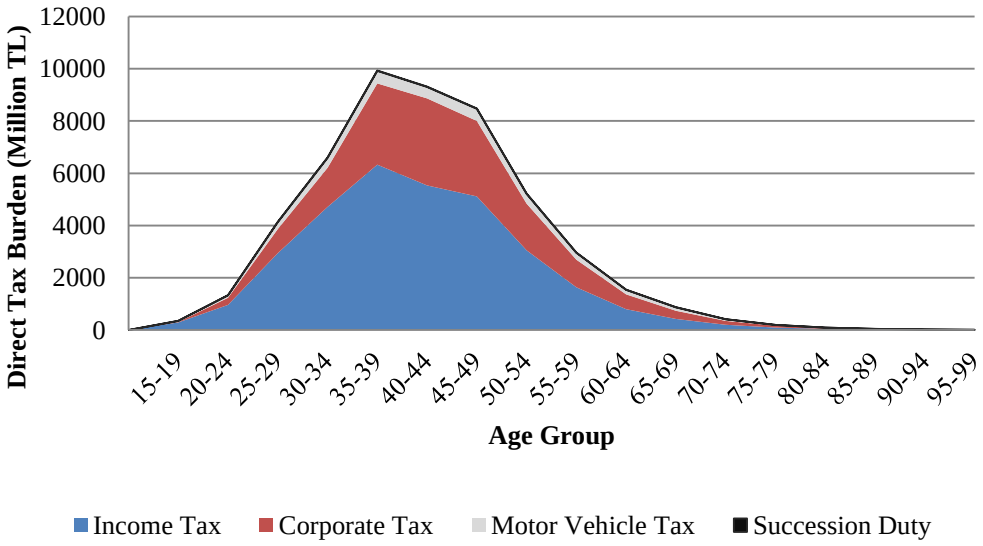


Figure 12: Cumulative Distribution of Direct Taxes (Males)

Source: 2008 Household Budget Survey, Author's own calculations

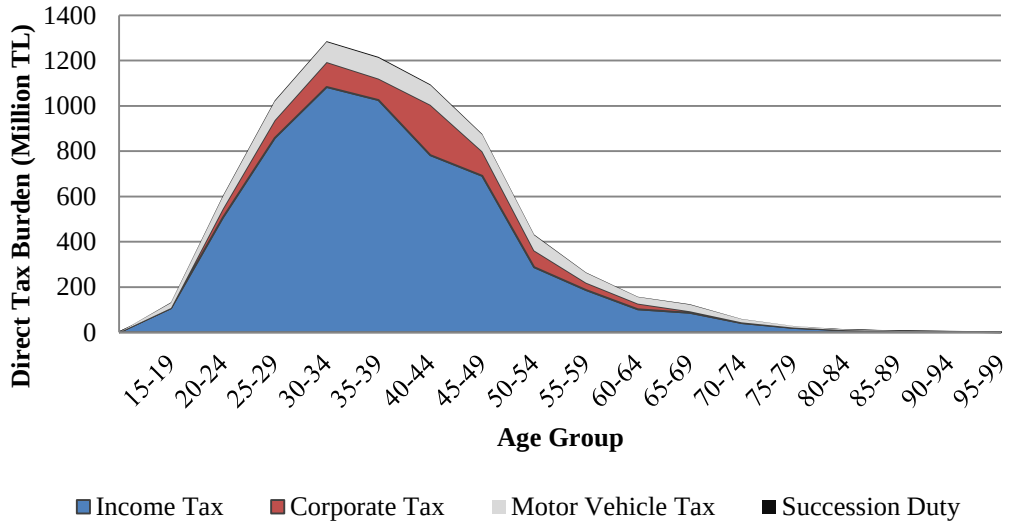


Figure 13: Cumulative Distribution of Direct Taxes (Females)

Source: 2008 Household Budget Survey, Author's own calculations

The Figures 11 and 12 provide the cumulative distribution of indirect taxes in a similar fashion. The pattern is closer to that of direct taxes yet the break in the male accounts at the 45-49 age interval and a similar hump in the female accounts between 65-69 are discernible.

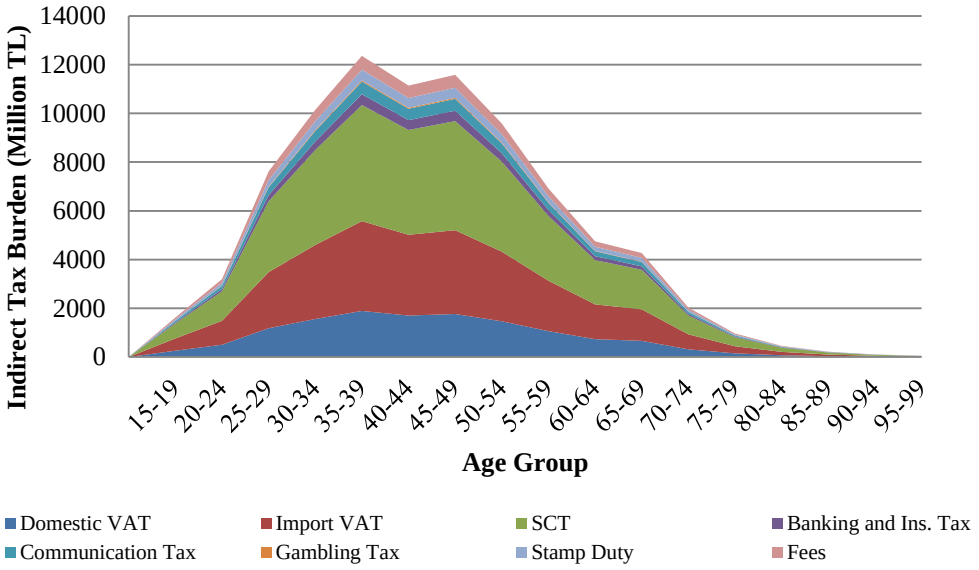


Figure 14: Cumulative Distribution of Indirect Taxes (Males)

Source: 2008 Household Budget Survey, Author's own calculations

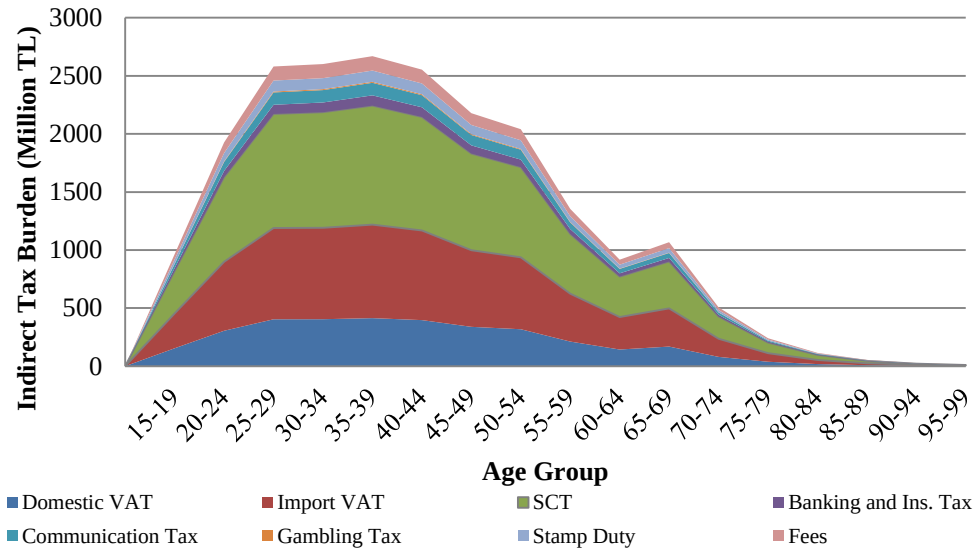


Figure 15: Cumulative Distribution of Indirect Taxes (Females)

Source: 2008 Household Budget Survey, Author's own calculations

As denoted in the analysis of direct taxes, the population hence the aggregate tax burden of the age group 30-34 is noticeably high. The second peak in the 45-49 interval is partly due to the high per capita taxes born by this group and partly because the pension payments make a jump for some members of this interval. The latter can be explained by the fact that a part of this age group is subjected to the old pensionable age regulations. For females, the second of the two peaks is observed at the age interval 65-69. This can again be explained by the extent of social security benefits received.

5.2.2 Transfers to Households and Social Security Balances

Receipts items specified in the Household Budget Survey are retirement pensions, old age benefits, widow's and orphan's annuities, disability payments, welfare funds, family allowances, war pensions, student grants, unemployment benefits and various supports. As indicated, there is substantial match between the items specified in the survey and the ones classified in the general budget as well as the social security budget. The aggregate figures are distributed to age-gender groups with the same methodology explained in 5.2.1.

Table 12: Per Capita Payments and Receipts, Males (TL)

	Generation's Age in 2008												
Tax/Transfer	**0-5**	**5-14**	**15-19**	**20-24**	**25-29**	**30-34**	**35-39**	**40-44**	**45-49**	**50-54**	**55-59**	**60-64**	**65+**
Income Tax	0	0	92.9	303.3	892.3	1629.2	2393.7	2345.4	2410.0	1704.5	1179.1	795.6	424.9
Corporate Tax	0	0	5.6	85.5	280.6	517.9	1175.5	1410.8	1361.2	998.1	761.4	565.1	311.6
VAT	0	0	82.1	158.5	358.3	539.1	715.0	720.7	831.5	818.6	764.4	728.9	596.6
SCT	0	0	194.7	381.4	882.4	1347.5	1803.0	1822.5	2110.2	2063.7	1916.4	1810.3	1464.8
Import VAT	0	0	160.1	309.1	698.5	1050.9	1394.0	1405.0	1621.1	1596.0	1490.3	1421.1	1163.2
Banking and Ins. Tax	0	0	13.5	29.1	75.2	121.2	167.3	171.0	200.4	192.1	175.1	160.6	124.2
Communication Tax	0	0	20.0	41.2	96.7	147.8	196.1	198.0	229.2	226.2	211.1	200.5	162.1
Gambling Tax	0	0	1.2	2.8	7.6	12.6	17.4	17.7	20.8	20.0	18.2	16.5	12.6
Stamp Duty	0	0	19.3	37.2	84.1	126.5	167.8	169.1	195.1	192.1	179.3	171.0	140.0
Fees	0	0	24.7	47.6	107.6	161.9	214.8	216.5	249.7	245.9	229.6	218.9	179.2
Motor Vehicles Tax	0	0	66.2	72.2	88.9	91.1	105.6	99.1	101.2	99.3	104.0	114.1	135.7
Succession Duty	0	0	1.3	1.9	3.3	4.2	5.2	5.1	5.7	5.8	5.7	5.8	5.4
Social Security Premium	0	0	70.1	448.3	1541.8	2555.5	3922.5	3759.5	3643.8	2149.2	1266.7	753.0	358.6
TOTAL PAYMENTS (1)	0	0	751.4	1451.2	4047.6	6684.4	10120.5	10163.0	10463.6	7839.3	5997.6	4772.8	3297.6
Education	0	126.6	78.5	19.9	6.3	3.0	3.2	1.4	0.1	0	0	0	0
Other Transfers	0	0	8.9	20.7	28.3	37.0	40.9	43.8	47.5	60.9	96.7	178.4	796.7
Health	83.0	73.4	73.0	72.2	214.1	244.0	266.9	299.0	363.2	430.6	555.3	767.7	2160.7
Pension	0	0	0	0	0	0	25.4	160.2	2435.1	5144.7	5640.0	5974.5	6726.0
Widow/Orphan Benefits	0	0	8.9	8.8	9.0	1.6	3.2	10.0	0	0	6.3	27.3	32.4
Old Age Benefits	0	0	0	0	0	0	0	0	0	0	0	4.2	110.9
TOTAL RECEIPTS (2)	83.0	199.9	169.2	121.6	257.8	285.5	339.6	514.5	2845.9	5636.2	6298.3	6952.0	9826.7
NET TAX (1)-(2)	-83.0	-199.9	582.2	1329.6	3789.8	6398.9	9780.9	9648.5	7617.7	2203.1	-300.7	-2179.2	-6529.1

Table 13: Per Capita Payments and Receipts, Females (TL)

	Generation's Age in 2008												
Tax/Transfer	**0-5**	**5-14**	**15-19**	**20-24**	**25-29**	**30-34**	**35-39**	**40-44**	**45-49**	**50-54**	**55-59**	**60-64**	**65+**
Income Tax	0	0	35.8	165.6	266.7	383.6	392.1	339.4	328.8	161.1	131.7	90.3	66.8
Corporate Tax	0	0	0.3	12.8	24.5	39	36.2	96.5	51.4	41.4	22.8	22.3	5.1
VAT	0	0	51.7	99.8	125.5	143.2	158.1	172.1	161.2	178.2	149.3	127.3	130.4
SCT	0	0	122.4	238.2	305.3	352.4	391.8	424.1	396.2	435.1	362.4	308.8	311.9
Import VAT	0	0	100.6	194.2	244.2	278.8	307.8	335	313.8	346.8	290.5	247.9	253.8
Banking and Ins. Tax	0	0	8.4	17.5	24.6	29.6	33.7	36.1	33.3	36.1	29.4	24.9	23.5
Communication Tax	0	0	12.2	25.3	33	37.7	41.2	45.2	42.6	47.7	39.8	33.7	33
Gambling Tax	0	0	0.7	1.6	2.4	2.9	3.3	3.5	3.3	3.6	2.9	2.4	2.1
Stamp Duty	0	0	12.1	23.4	29.4	33.6	37	40.3	37.8	41.7	35	29.8	30.5
Fees	0	0	15.5	29.9	37.6	43	47.4	51.6	48.3	53.4	44.8	38.2	39.1
Motor Vehicles Tax	0	0	7.4	17.4	25.7	31.2	35	37.3	34.8	37.6	30.3	25.4	22.3
Succession Duty	0	0	0.9	1.3	1.4	1.5	1.6	1.8	1.6	1.8	1.5	1.4	1.7
Social Security Premium	0	0	38.7	304.6	475	515.7	605	515.2	356.7	146.1	41.2	58.9	0
TOTAL PAYMENTS (1)	0	0	406.6	839.7	1.223.90	1.466.60	1.619.80	1.586.30	1.330.70	1.001.10	739.2	634.4	538.3
Education	0	129.2	81.0	20.1	5.5	2.9	1.1	0.4	0.3	0		0	0
Other Transfers	0	0	0	32.2	63.8	62.2	60.2	61.2	59.3	60.7	67.0	85.6	295.7
Health	76.1	62.1	80.8	78.9	94.7	107.9	116.5	132.2	307.7	362.1	455.4	573.3	1386.2
Pension	0	0	0.0	0.0	0.7	5.0	8.8	265.7	644.2	1318.5	1289.5	1043.2	758.6
Widow/Orphan Benefits	0	0	32.4	29.6	20.8	39.5	115.5	189.4	225.7	398.8	687.3	776.8	1278.4
Old Age Benefits	0	0	0	0	0	0	0	0	0	0	0	10.4	123.1
TOTAL RECEIPTS (2)	76.1	191.3	194.3	160.8	185.5	217.4	302.1	649.0	1237.2	2140.1	2499.2	2489.4	3842.1
NET TAX (1)-(2)	0	-129.2	-113.4	-81.9	-90.8	-109.5	-185.6	-516.8	-929.5	-1777.9	-2043.8	-1916.0	-2455.8

5.3 Government Consumption

Government consumption is defined as the government expenditure less current transfers and interest payments. More formally it represents the amount spent on the purchase of goods and services, wage payments, defence, education, judicial system expenditures…etc.

Table 14: Centralized Government Budget, 2008 (million TL)

Receipts		Expenditures	
Tax Revenue	**168.109**	**Expenditures Net of Interest Payment**	**176.369**
Income Tax	38.030	Wages	48.856
Corporate Tax	16.905	Social Security Contribution	6.408
Succession Duty	144	Purchases of Goods and Services	24.412
Motor Vehicle Tax	3.944	Current Transfers	70.360
Domestic VAT	16.805	Capital Expenditures	18.516
Special Consumption Tax	41.832	Capital Transfers	3.174
Petr. and Ntr. Gas Products	23.941	Lending	4.644
Motor Vehicles	3.805	**Interest Payment**	**50.661**
Alcoholic Beverages	1.987		
Tobacco Products	10.888		
Cola Beverages	205		
Other	1.005		
Bank. and Ins. Trans. Tax	3.695		
Gambling Tax	376		
Communication Tax	4.551		
VAT on Import	32.781		
Stamp Duty	3.945		
Fees	5.050		
Non-Tax Revenue	**41.490**		
Enterprise and Owns. Revenues	7.422		
Gifts Received	850		
Interest. Share and Fine revenues	17.126		
Capital Income	9.114		
Other	6.979		
TOTAL RECEIPT	**209.599**	**TOTAL EXPENDITURE**	**227.031**
Deficit (-)	17.432		
Primary Surplus	33.230		

Source: Ministry of Finance (database), Budget Figures and Budget Realizations,2012

The relevance of government consumption to the GA calculations is that this sum represents an amount that cannot be distributed according to age and gender specifics. Hence it is taken as an aggregate and projected to the future by using a predetermined growth rate. For the

year 2008 government consumption realized as 100 billion TL according to the economic categorization of central government budget aggregates.

5.4 Government's Net Wealth

The government net indebtedness, or the negative of the government net wealth, is the difference between government's outstanding liabilities and assets at a given point in time. In the GA literature there are different views about the accurate calculation of this amount and depending on the availability of data; different authors make use of different variables or aggregates. In essence what the study needs is a variable that The Total Public Net Debt Stock data taken from the Undersecretaries of Treasury database provides the best approximation for this variable, regarding the purposes of this study. The Total Public Net Debt Stock is calculated as the Total Public Gross Debt Stock less the Central Bank Assets, Public Assets and Unemployment Insurance Fund's Assets. Total Public Net Debt Stock was 268 billion TL for the year 2008.

5.5 Population Projections

The population projections constitute a crucial part of the generational account calculations since the burden born by different generations vary significantly under different assumptions of fertility, mortality and dependency ratio scenarios.

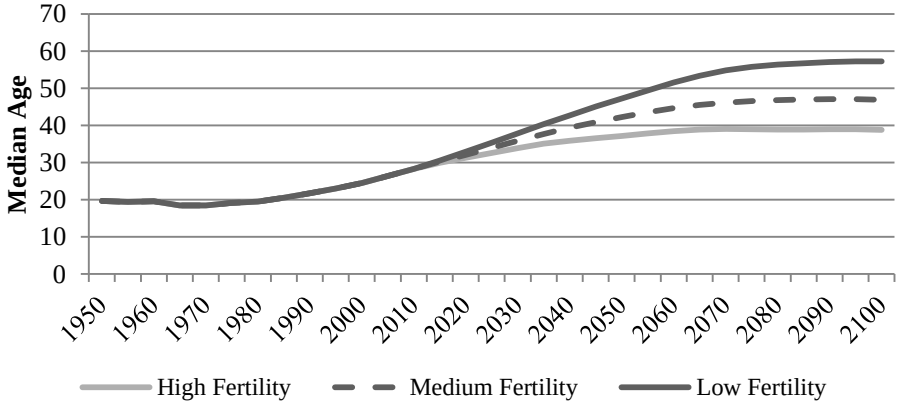


Figure 16: Median Age for Turkey under High, Medium and Low Fertility Assumptions (1950-2100)

Source: UN World Prospects (database) - World Population Prospects, 2010 Revision

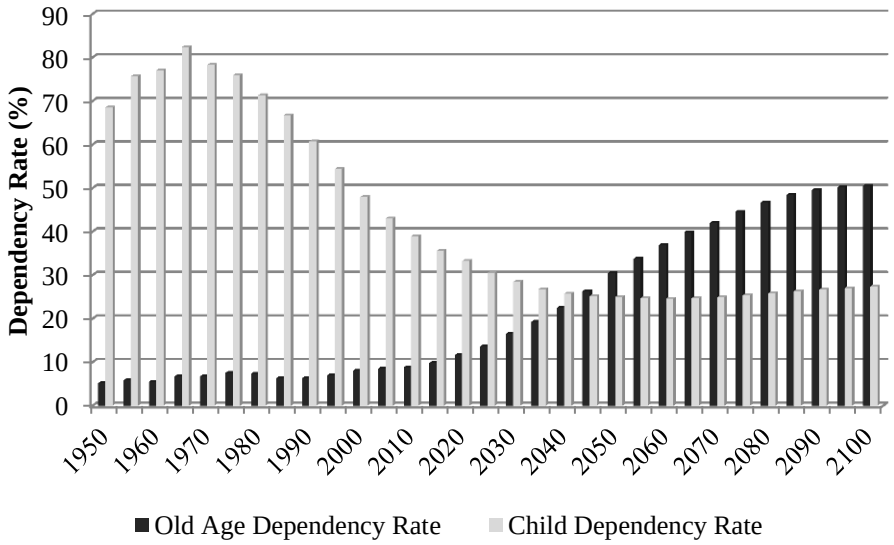


Figure 17: Old Age and Child Dependency Rates for Turkey[28] (1950-2100)

Source: UN World Prospects (database) - World Population Prospects, 2010 Revision

Figure 13 displays the evolution of median age for Turkey under high, medium and low fertility assumptions, projections starting from 2010 and extending to 2100. Results indicate that even under the high fertility assumption, the median age of Turkish population will roughly be doubled in 2100 compared to the 2010 figures. This means that population ageing problem is relevant for the Turkish generational accounts as well as it is for the US and the European economies. Comparing Turkey's demographic projections with those of the countries studied in the literature (see Appendix B), one shall observe that the median age is discernibly low and will remain as such in the foreseeable future. However as of 2100 Turkey is expected to have more or less equivalent figures with the rest of the world. Figure 14 presents the old age and child dependency ratios for the same projection horizon. Projections indicate that in the long run, the active workers class will be faced by an overwhelming pressure to support and compensate for the young and the elderly population. The urgency of a reform movement becomes more evident when these projections are investigated.

[28]Old-age dependency rate is defined as the ratio of the total number of senior individuals (those who are aged 65 and above) to the total number of those who are at the working age (those who are aged between 15 and 64). Child dependency ratio is defined as the total number of those who under the legal working age (those who are aged between 0 and 14) to the total number of those who are at the working age (those who are aged between 15 and 64). UN offers three other indices of old age and child dependency ratio for different age intervals however these two are the most conventional ones and they fit the legal working and retirement age for Turkey. Old age and child dependency ratios are indicative of the "supporting capacity" of the population.

Table 15: Demographic Projections for Selected Age Intervals between 2013-2100

	Population (thousands)				Dependency Ratio (%)		
Year	**0-14**	**15-64**	**65+**	**Total**	**Old Age**	**Child**	**Total**
2013	18,864	51,517	5,430	75,811	10.5	36.6	47.2
2014	18,883	52,246	5,578	76,707	10.7	36.1	46.8
2015	18,890	52,970	5,741	77,601	10.8	35.7	46.5
2016	18,885	53,660	5,933	78,478	11.1	35.2	46.3
2017	18,874	54,307	6,156	79,337	11.3	34.8	46.1
2018	18,845	54,901	6,427	80,173	11.7	34.3	46.0
2019	18,838	55,469	6,676	80,983	12.0	34.0	46.0
2020	18,831	56,003	6,944	81,778	12.4	33.6	46.0
2021	18,819	56,513	7,226	82,558	12.8	33.3	46.1
2022	18,806	57,001	7,521	83,328	13.2	33.0	46.2
2023	18,778	57,450	7,825	84,053	13.6	32.7	46.3
2024	18,746	57,877	8,118	84,741	14.0	32.4	46.4
2025	18,708	58,264	8,435	85,407	14.5	32.1	46.6
2030	17,000	59,784	9,881	86,665	16.5	28.4	45.0
2035	16,275	60,766	11,729	88,770	19.3	26.8	46.1
2040	15,678	60,928	13,695	90,302	22.5	25.7	48.2
2045	15,179	60,241	15,831	91,251	26.3	25.2	51.5
2050	14,716	58,931	17,969	91,617	30.5	25.0	55.5
2055	14,254	57,707	19,478	91,438	33.8	24.7	58.5
2060	13,823	56,214	20,764	90,800	36.9	24.6	61.5
2065	13,464	54,561	21,755	89,780	39.9	24.7	64.5
2070	13,193	53,014	22,270	88,478	42.0	24.9	66.9
2075	12,979	51,205	22,813	86,998	44.6	25.3	69.9
2080	12,790	49,498	23,138	85,426	46.7	25.8	72.6
2085	12,606	47,978	23,239	83,823	48.4	26.3	74.7
2090	12,437	46,663	23,127	82,227	49.6	26.7	76.2
2095	12,298	45,521	22,854	80,673	50.2	27.0	77.2
2100	12,197	44,509	22,494	79,200	50.5	27.4	77.9

Source: UN (database), Population Prospects, 2012

5.6 Drawbacks and Limitations of the GA Methodology

GA methodology has several advantages over the traditional and static measures of fiscal sustainability, most of which have been explained in the discussions above. However as pointed out by Haveman (1994), Levy and Dore (1998), Gokhale (1999), Cardarelli (1999), Raffelhüschen (2000), Jablonowski, Müller and Raffelhüschen (2010), Hagist, Moog and Raffelhüschen (2012) and a number of others in detail, the method does not come without empirical and theoretical limitations. When interpreting the results, these drawbacks should be kept in mind in order not to reach expeditious conclusions.

The major theoretical criticism is that GA is a partial equilibrium analysis hence it fails to display the effect of a structural fiscal change on the consumption and saving patterns of

households (and/or government) as well as the effect of such policy changes on the factor prices. As highlighted by Haveman (1994) changes in the fiscal policy modify the behavioural patterns of individuals like increased informality due to high income taxation, discretionary unemployment due to increased unemployment benefits or enhanced bequest motive due to reduced transfers and GA is insufficient in capturing these effects, thus the implied welfare outcomes of GA policy experiments can at best be arbitrary. Moreover the methodology assumes that the tax and transfer structure will remain constant through time, an assumption that rules out the possibility of shocks and structural changes that the fiscal system might undergo. That is why some authors claim that GA results should be accepted more as an experiment rather than an accurate forecast, even though it is a much better indicator than the annual budget deficit.

The first empirical critique is about the choice and the generalization of the discount rate. One fundamental step of constructing accounts is to discount the aggregate receipt and payment figures to the present value (i.e. to the base year) however the method does not involve a differentiation of the relevant rate. As pointed out by Raffelhüschen (2000) the cost of waiting and the degree of risk might vary substantially among taxes and transfers as well as among different cohorts hence it is perceived that using the same rate regardless of the fiscal item or the generation which is dealt with causes an arbitrary and flawed aggregation. Jablonowski, Müller, Raffelhüschen (2010) states that the sensitivity analysis presented in almost all GA papers is a solution to this problem however claims that to the extent that GA results are very susceptible to the changes in the discount rate, the choice of this variable should be handled more rigorously. He offers the utilization of long term equity rates or return of inflation indexed bonds as a more accurate proxy to the discount rate however he does not suggest a way to differentiate the discount rate through time and among fiscal items.

A very similar criticism is related to the choice of growth and labour productivity rates. "Generational Accounting in the World"- a compilation of seventeen country studies- assumes a common growth rate (i.e. 1.5%) for all countries. Knowing that, for example Thailand is expected to grow with a pace of 4.5% in the upcoming two consecutive years whereas the UK economy is expected to go down a recession, one might think that such a generalization might cause bias in the GA results, however three points need to be considered. First, the aim of those who favour GA is to make it an annual calculation that can flexibly and frequently be updated according to the changes in the economy. If that is

achieved, then cyclical changes such as the change in growth expectation can readily be incorporated to the model. Second, although the time horizon under consideration is extremely large (infinity to be precise), values closer to today matter more than the values in distant future, one aspect of discounting to the present value. So even if accurate projections about, say the growth rate of the economy in 2100, cannot be done, aggregate figures in that year will become so infinitesimal when discounted that they will have no virtual weight in the GA calculation. Third, although the convergence debate has not been fully resolved in the economic growth literature, there is mounting evidence that the probability of a country to reach the frontier growth rate increases with the level of technology transfer (Acemoğlu, Aghion and Zilibotti, 2002) and/or financial advancement (Aghion, Howitt and Mayer-Foulkes, 2004) so at least for the countries considered by GA (most of which are developed countries with the exception of Hungary, Thailand, Argentina and Poland), there is some scope for a common and steady growth rate in the future.

A third critique questions the accuracy of the population projections however provided that almost all studies analysing fiscal sustainability make use of the same ubiquitous population statistics made available by UN, IMF, World Bank, Eurostat or national sources, one shall not perceive this as a drawback specific to GA. Alho and Vanne (2006) study the Finnish case to show that GA results are particularly sensitive to stochastic population parameters however sensitivity analysis seem to be the most reasonable and applicable (and in fact the only) solution to the problem. Despite admitting that there is room for improvement regarding this issue, aims of this paper do not necessitate further attention on this problem.

Another empirical criticism is that the selection of the base year is very central to the results of the analysis. Depending on which part of the business cycle the base year remains, the future projections may be over-optimistic or way too pessimistic, both of which should be avoided in GA studies. There is no predefined criteria on how to choose the base year however as a rule of thumb, it will be meaningful to pick the year which resembles most to the present and the foreseeable future. In our study regarding the Turkish case, we were faced with the challenge of making a choice between 2008, 2009 and 2010[29]. 2009 and 2010 would be poor choices since they were the years of crisis and recovery, respectively. The interested reader shall go through Chapter 3 to observe that the fiscal balances of Turkey, likewise many other countries, were massively altered in those years hence choosing one of

[29] The last Household Budget Survey published by the Turkish Statistical Institute dated back to 2010 as of the beginning of this paper.

them would underestimate the future performance. It is true that 2008 was an exceptionally successful year in terms of economic performance and fiscal balances however Turkey seems to have caught the 2008 levels and the Medium Term Program estimates that this will be sustained at least in the foreseeable future. Moreover the 2008 signifies the beginning of a reform act in the tax and social security system. Since it is the year before the full implementation of reform acts, we can experiment the results of reform policies more accurately.

CHAPTER
6

RESULTS AND DISCUSSION

This chapter is comprised of findings and arguments that constitute the main motivation of this study which is to construct and present the initial set of generational accounts for Turkey. First the generational accounts of current and future generations under various scenarios of exogenous variables (i.e. growth rate and discount rate) and demographic projections will be presented. Then the long term effect of different fiscal policy actions specifically the effect of an increase in the corporate tax rate to pre-1983 level of 40%, a reduction in government consumption, an increase in the social security premium contributions and an increase in the income tax will be investigated. The chapter will be concluded after a discussion of the results.

6.1 Basic Findings

Table 16 displays the baseline[30] generational accounts of males and females alive in the base year 2008 through five year intervals[31] and compares these values with the net tax burden of future new-borns. The accounts are presented for males, females separately and the total population. The initial observation is that there exists a huge gender gap among male and female accounts. Whereas a new-born male (i.e. born in 2008) bears a 49,510 TL life time net tax burden, a new-born female appears to be a net beneficiary through nearly the whole life cycle. However this should not be regarded as an evidence of gender inequality to the disadvantage of males. Turkish females are engaged in income generating activities that are not typically exchanged in the market. Moreover the life expectancy for females is higher than that of males, which means that women receive higher benefits at the elderly period of their life cycle due to old age benefits, widow funds and inherited pensions from their deceased spouses[32]. The second remarkable finding is that similar to a number of countries studied in the literature, there exists a fiscal imbalance to the disadvantage of those who are not yet born in Turkey as well. The gap among current and future generations' accounts on the other hand remains relatively modest with a percentage difference of 24.3%. The results might seem puzzling at first sight given the frequently uttered discontent with the fiscal balances and the level of debt however a closer attention to the tax, transfer and social security dynamics will help understanding the relative smallness of the imbalance.

First of all, as it has been extensively covered in Chapter 3, Turkey does not have a generous and redistributive transfer system that is capable of distorting fiscal balances to the favour of future generations. The amount of in cash and in kind benefits transferred to the households is significantly low compared to a number of countries and it is deemed to remain the same in both in the short and long run. More important than that, the pay-as-you-go system is not as deadlocked as it is in the European welfare states who are faced with the problem of ageing population in the near future. As of the old dependency rate, Turkey ranks the second among countries listed in Appendix B.

[30] Baseline scenario: Discount rate (r) =5%, Growth Rate (g) =1.5%, Medium Population Growth

[31] The generational accounts have been calculated for all those who were aged between 0-100 in 2008 however for convenience the results are presented in five year intervals and population among 80, which is a negligible portion of the population in 2008, has been excluded.

[32] See Tables 17, 18 and 19 for the distribution of GA according to payment and receipt items for females, males and the total population, respectively.

Table 16: Generational Accounts under Baseline Scenario* (TL)

Generation's Age in 2008	Net Lifetime Payments		
	Males	Females	Total
0	49,510	-1,030	24,240
5	58,860	-1,190	28,835
10	70,460	-0,560	34,950
15	89,510	0,160	44,835
20	104,800	-0,160	52,320
25	116,010	-2,640	56,685
30	133,060	-8,070	62,495
35	131,540	-15,650	57,945
40	106,500	-26,680	39,910
45	67,390	-38,190	14,600
50	20,000	-41,480	-10,740
55	-3,010	-46,580	-24,795
60	-17,690	-47,440	-32,565
65	-31,140	-56,580	-43,860
70	-34,660	-49,430	-42,045
75	-40,640	-49,250	-44,945
80	-43,550	-47,520	-45,535
Future Newborns	58,990	1,610	30,300
Percentage Difference			24.3%

*Discount rate (r) =5%, Growth Rate (g) =1.5%, Medium Population Growth

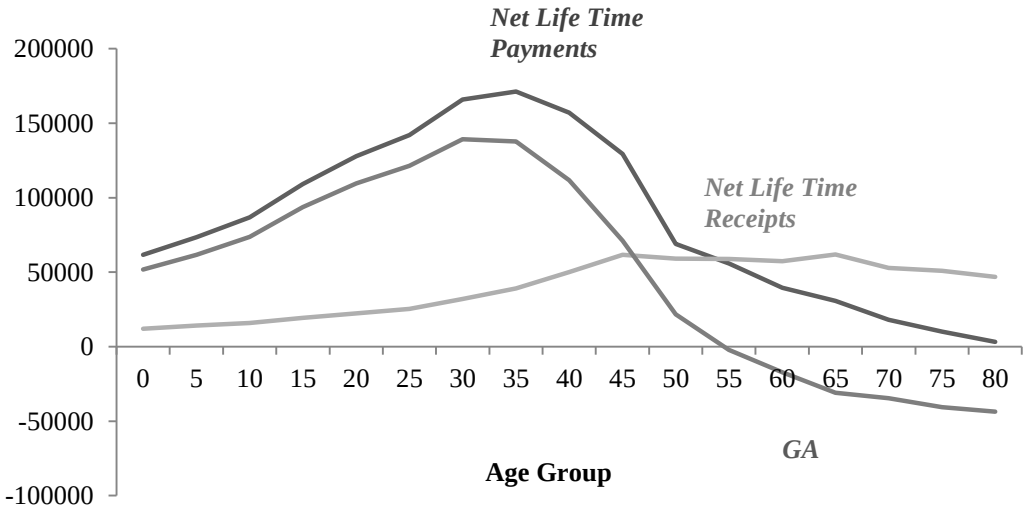


Figure 18: Net Life Time Payments, Receipts and GA (Males)

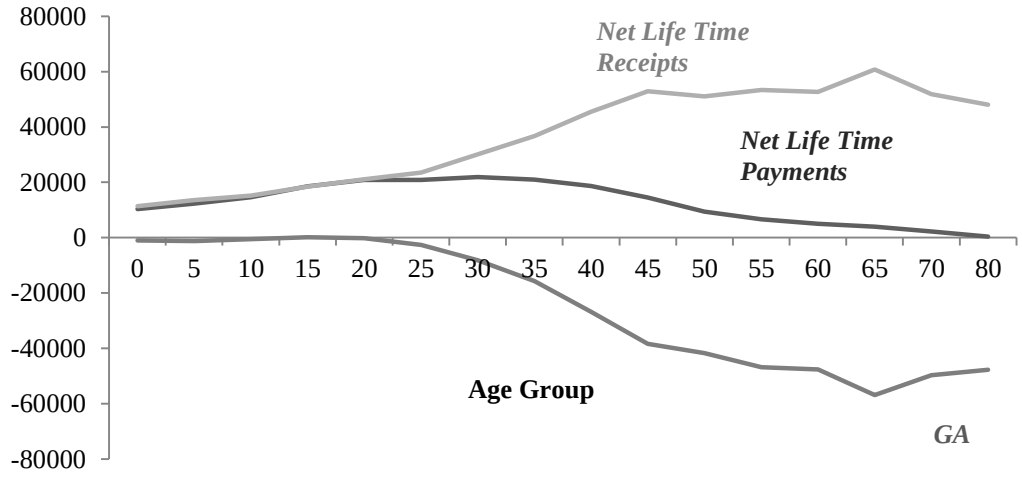


Figure 19: Net Life Time Payments, Receipts and GA (Females)

6.2 Sensitivity Analysis

As underlined in Chapter 2 one of the major empirical criticisms toward generational accounting is about the choice of exogenous parameters namely the growth and the discount rate. Hence we present a sensitivity analysis with three discount rate and three growth rate assumptions. Although the magnitude of fiscal imbalance changes, the direction does not.

The highest generational imbalance suggested by the figures is 80.84%, realized under the 1% growth rate and 7% discount rate combination. A growth rate of 2% accompanied by a 3% discount rate yields the lowest fiscal gap; 7.43% to be precise. The variation among percentage imbalances might seem puzzling however GA results are very much susceptible to the changes in the exogenous parameters, which is confirmed by other studies as well (see Appendix C for sensitivity analysis results from Japan, Germany, Canada, Italy and Thailand). The change in the direction of the generational account is a much less interpretable result than the change in the magnitude. Our results indicate that regardless of the choice of exogenous variables, a fiscal imbalance exists to the disadvantage of those who are not yet born.

Table 17: Composition of Generational Accounts for the Base Case (TL)-FEMALES

		Payments							Receipts					
Age in 2008	**Net Tax**	**Income Tax**	**Corporate Tax**	**VAT**	**Other Taxes**	**SCT**	**Import VAT**	**Social Security Premium**	**Pension**	**Widow Orphan**	**Health**	**Education**	**Old Age**	**Other**
0	-1,030	544	289	1,343	352	2,538	1,716	3,518	-1,058	-4,821	-2,713	-1,886	-344	-508
5	-1,196	651	346	1,617	424	3,057	2,065	4,187	-1,277	-5,866	-3,113	-2,233	-409	-644
10	-563	771	412	1,923	505	3,640	2,457	4,937	-1,538	-7,097	-3,622	-1,667	-482	-801
15	159	974	521	2,450	644	4,638	3,126	6,214	-1,977	-9,159	-4,519	-1,086	-606	-1060
20	-161	1,130	627	2,656	711	5,107	3,428	7,256	-2,463	-10,830	-5,103	-660	-735	-1286
25	-2,656	1,152	683	2,624	712	5,097	3,466	7,101	-2,989	-12,573	-5,575	-174	-873	-1308
30	-8,117	1,232	795	2,833	772	5,511	3,744	7,057	-4,035	-16,517	-6,838	-62	-1157	-1451
35	-15,733	1,103	819	2,816	767	5,479	3,753	6,243	-5,240	-20,453	-7,976	-31	-1475	-1537
40	-26810	913	857	2,719	738	5,290	3,619	4,542	-7,046	-24,992	-9,733	-13	-2013	-1691
45	-38,379	673	507	2,357	639	4,587	3,198	2,532	-8,280	-28,610	-11,464	-6	-2701	-1812
50	-41,680	338	292	1,713	463	3,333	2,387	854	-7,349	-28,143	-10,702	-3	-3147	-1716
55	-46,799	243	166	1,259	339	2,451	1,835	314	-5,768	-30,037	-11,464	-1	-4214	-1923
60	-47,657	172	113	918	248	1,787	1,521	225	-4,161	-28,726	-12,018	0	-5580	-2155
65	-56,832	154	51	704	190	1,370	1,453	0	-3,233	-31,295	-14,922	0	-8426	-2880
70	-49,648	91	30	414	112	806	761	0	-2,671	-25,837	-13,794	0	-6968	-2593
80	-47,721	16	5	73	24	142	77	0	-2,212	-21,371	-16,460	0	-5774	-2242

Future Generations: 1,610

Table 18: Composition of Generational Accounts for the Base Case (TL)-MALES

		Payments							Receipts					
Age in 2008	**Net Tax**	**Income Tax**	**Corporate Tax**	**VAT**	**Other Taxes**	**SCT**	**Import VAT**	**Social Security Premium**	**Pension**	**Widow Orphan**	**Health**	**Education**	**Other**	**Old Age**
0	49,510	14,175	5,648	4,852	1,343	9,459	6,594	19,648	-5,126	-232	-3,948	-1,620	-710	-304
5	58,860	16,844	6,715	5,807	1,608	11,326	7,902	23,210	-6,129	-290	-4,650	-1,926	-866	-361
10	70,460	19,902	7,950	6,899	1,911	13,462	9,407	27,269	-7,297	-356	-5,499	-1,333	-1,048	-425
15	89,510	25,027	10,011	8,735	2,421	17,050	11,921	34,075	-9,259	-465	-6,963	-688	-1,337	-533
20	104,800	29,354	11,973	10,097	2,805	19,714	13,784	40,073	-11,365	-436	-8,198	-213	-1,571	-646
25	116,010	32,696	13,637	11,094	3,091	21,668	15,253	44,572	-13,594	-391	-8,772	-100	-1,759	-766
30	133,060	38,440	16,809	12,864	3,595	25,135	17,571	51,456	-18,051	-373	-10,424	-76	-2,177	-1,014
35	131,540	39,092	18,827	13,363	3,743	26,121	18,361	51,824	-23,079	-449	-11,687	-66	-2,545	-1,291
40	106,500	34,918	17,821	13,116	3,676	25,659	17,783	44,115	-31,045	-521	-13,536	-54	-3,127	-1,758
45	67,390	27,611	14,065	12,032	3,371	23,564	16,612	32,166	-39,921	-476	-15,120	-51	-3,775	-2,354
50	20,000	15,665	8,384	8,685	2,428	17,044	1,1461	15,587	-37,454	-535	-14,418	-41	-3,960	-2,740
55	-3,010	10,037	5,740	6,835	1,909	13,461	9,311	8,673	-33,945	-694	-15,848	-37	-4,792	-3,670
60	-17,690	6,627	3,939	5,223	1,462	10,346	6,806	5,126	-28,817	-817	-17,122	-30	-5,658	-4,856
65	-31,140	5,258	3,065	3,979	1,131	8,005	5,512	3,679	-24,036	-793	-21,686	-17	-7,786	-7,590
70	-34,660	3,164	1,800	2,329	680	4,810	3,211	2,157	-19,860	-655	-19,069	-13	-7,084	-6,277
75	-40,640	1,705	916	1,179	365	2,585	2,246	1,096	-17,878	-589	-20,289	-9	-6,494	-5,653
80	-43,550	590	257	327	126	889	713	307	-16,444	-541	-19,444	0	-5,312	-5,201

Future Generations: 58,990

Table 19: Composition of Generational Accounts for the Base Case (TL)-TOTAL

		Payments							Receipts					
Age in 2008	**Net Tax**	**Income Tax**	**Corporate Tax**	**VAT**	**Other Taxes**	**SCT**	**Import VAT**	**Social Security Premium**	**Pension**	**Widow Orphan**	**Health**	**Education**	**Old Age**	**Other**
0	24,375	7,360	2,968	3,098	848	5,999	4,155	11,583	-3,092	-2,526	-3,330	-1,753	-324	-609
5	28,996	8,747	3,531	3,712	1,016	7,191	4,983	13,698	-3,703	-3,078	-3,881	-2,080	-385	-755
10	35,140	10,337	4,181	4,411	1,208	8,551	5,932	16,103	-4,418	-3,727	-4,561	-1,500	-454	-925
15	45,077	13,001	5,266	5,592	1,532	10,844	7,523	20,144	-5,618	-4,812	-5,741	-887	-569	-1,198
20	52,605	15,242	6,300	6,376	1,758	12,411	8,606	23,665	-6,914	-5,633	-6,650	-437	-691	-1,428
25	56,987	16,924	7,160	6,859	1,901	13,383	9,359	25,836	-8,291	-6,482	-7,173	-137	-819	-1,534
30	62,819	19,836	8,802	7,849	2,184	15,323	10,657	29,257	-11,043	-8,445	-8,631	-69	-1,086	-1,814
35	58,241	20,097	9,823	8,090	2,255	15,800	11,057	29,034	-14,160	-10,451	-9,832	-49	-1,383	-2,041
40	40,119	17,916	9,339	7,917	2,207	15,474	10,701	24,329	-19,045	-12,757	-11,634	-33	-1,885	-2,409
45	14,673	14,142	7,286	7,194	2,005	14,076	9,905	17,349	-24,100	-14,543	-13,292	-28	-2,528	-2,794
50	-10,787	8,001	4,338	5,199	1,445	10,189	6,924	8,220	-22,401	-14,339	-12,560	-22	-2,944	-2,838
55	-24,910	5,140	2,953	4,047	1,124	7,956	5,573	4,494	-19,856	-15,366	-13,656	-19	-3,942	-3,358
60	-32,714	3,399	2,026	3,071	855	6,066	4,163	2,675	-16,489	-14,771	-14,570	-15	-5,218	-3,907
65	-44,056	2,706	1,558	2,341	661	4,688	3,483	1,840	-13,634	-16,044	-18,304	-9	-8,008	-5,333
70	-42,227	1,627	915	1,372	396	2,808	1,986	1,079	-11,266	-13,246	-16,431	-6	-6,622	-4,839
75	-44,270	860	460	626	195	1,364	1161	548	-10,045	-10,980	-18,374	-4	-5,713	-4,368
80	-44,756	299	130	179	71	475	412	154	-9,175	-9,465	-19,131	0	-5,082	-3,623

Future Generations: 30,300

Table 20: Sensitivity Analysis

	g=1%			*g=1.5%*			*g=2%*		
	r=3%	***r=5%***	***r=7%***	***r=3%***	***r=5%***	***r=7%***	***r=3%***	***r=5%***	***r=7%***
Current Males	105.410	49.510	23.790	106.040	49.750	23.961	129.070	60.390	28920
Future Males	111.540	58.770	38.670	112.060	58.990	38.770	135.990	69.050	42690
Current Females	-10.230	-1.029	209	-10.280	-1.030	210	-15.980	-2.030	150
Future Females	-8.700	16.200	4.730	-8.750	1.610	4.720	-14.500	320	4.210
Current Newborn	47.590	24.241	12.000	47.880	24.360	12.086	56.545	29.180	14.535
Future Newborn	51.420	37.485	21.700	51.655	30.300	21.745	60.745	34.685	23.450
Absolute Imbalance	3.830	13.245	9.701	3.775	5.940	9.660	4.200	5.505	8.915
Percentage Imbalance	8.05	54.64	80.84	7.88	24.38	79.93	7.43	18.87	61.33

Author's own calculations.

6.3 Policy Experiments

The final contribution of this thesis is to extend the Turkish GA analysis by making various policy experimentations. In this respect, one can implement and measure the effect of a myriad of policy amendments however the most sensible approach is to seek policies that can remedy the fiscal imbalance. Three of the policy experiments discussed in this chapter will serve this purpose whereas an additional experiment will be carried out to show how the generational balances will be distorted by a change in the corporate tax rate.

Table 21: Generational Accounts under Alternative Scenario 1 (TL)
(56% Reduction in the Government Consumption)

Generation's Age in 2008	Net Lifetime Payments		
	Males	**Females**	**Total**
0	38,460	-1,610	18,425
5	45,720	-1,890	21,915
10	54,900	-1,390	26,755
15	69,920	-0,880	34,52
20	81,370	-1,420	39,975
25	89,290	-4,020	42,635
30	100,060	-9,710	45,175
35	94,480	-17,370	38,555
40	71,340	-28,520	21,41
45	39,540	-39,390	0,075
50	3,310	-42,270	-19,48
55	-14,520	-47,130	-30,825
60	-25,660	-47,880	-36,77
65	-37,420	-56,930	-47,175
70	-38,410	-49,710	-44,06
75	-42,650	-49,490	-46,07
80	-44,250	-47,730	-45,99
Future Newborns	38,780	1,610	20,195
Percentage Difference			0.96%

*Discount rate (r) =5%, Growth Rate (g) =1.5%, Medium Population Growth

Table 21 presents the generational accounts for current and future generations under a 56% cut in the government consumption scenario. Although it is not a realistic experiment, the results indicate that a policy action that strives to alleviate the generational imbalance by cutting down government consumption would necessitate unattainable deductions. The

relevant balance can be attained by less costly policy actions. One of such policy actions is to increase the social security contributions by 10%. Table 22 present the results of such a policy action.

Table 22: Generational Accounts under Alternative Scenario 2 (TL)
(10% Increase in Social Security Contributions)

Generation's Age in 2008	Net Lifetime Payments		
	Males	Females	Total
0	51,860	-650	25,600
5	61,640	-750	30,450
10	73,720	-400	36,840
15	93,600	820	47,210
20	109,610	610	55,110
25	121,340	-1,900	59,720
30	139,190	-7,360	65,910
35	137,690	-15,070	61,310
40	111,710	-26,320	42,690
45	71,120	-38,110	16,500
50	21,740	-41,590	-9,920
55	-2,110	-46,770	-24,440
60	-17,240	-47,630	-32,430
65	-30,900	-56,830	-43,860
70	-34,580	-49,650	-42,120
75	-40,710	-49,460	-45,080
80	-43,700	-47,720	-45,710
Future Newborns	52,710	-510	26,100
Percentage Difference			1.95%

*Discount rate (r) =5%, Growth Rate (g) =1.5%, Medium Population Growth

As the figures suggest, it is possible to attain generational imbalance by simply increasing the social security contributions by 10% which is a smaller sacrifice and a more realistic policy action. Even a more efficient way of alleviating fiscal gap is to increase the tax revenue sourced from the highest income bracket. It is possible remedy (and even slightly to improve compared to the current generations) the fiscal burden of future generations by increasing the income tax revenue by 0.2% which can simply be achieved through a 1.42% increase in the revenue gathered from the highest income bracket.

Table 23: Generational Accounts under Alternative Scenario 3 (TL)
(0.2% Increase in the Income Tax Revenue)

Generation's Age in 2008	Net Lifetime Payments		
	Males	**Females**	**Total**
0	51,890	650	25,620
5	61,670	750	30,460
10	73,760	30	36,860
15	93,650	820	47,240
20	109,660	620	55,140
25	121,410	-1,900	59,750
30	139,270	-7,360	65,950
35	137,770	-15,060	61,350
40	111,770	-26,320	42,730
45	71,170	-38,110	16,530
50	21,780	-41,590	-9,910
55	-2,090	-46,770	-24,430
60	-17,220	-47,630	-32,430
65	-30,880	-56,830	-43,860
70	-34,580	-49,650	-42,110
75	-40,700	-49,460	-45,080
80	-43,700	-47,720	-45,710
Future Newborns	52,630	-540	25,310
Percentage Difference			-1.21%

*Discount rate (r) =5%, Growth Rate (g) =1.5%, Medium Population Growth

Our final experiment is based upon a hypothetical scenario that involves a 50% increase in the corporate tax revenues hence the adoption of pre-1983 corporate tax rates. Results presented in Table 24 indicates that the generational impact of such practice would be to distort the fiscal balances in favour of future generations. Considering the magnitude of the change, the results are not surprising. Moreover they indicate that the fiscal balances of the economy are sensitive to the changes in the corporate tax and amendments in this particular item should be handled rigorously.

The first thing that should be noted regarding the policy experiments is that these calculations are carried out in a partial equilibrium framework hence it is not possible to compute or estimate the impact of these policy amendments on the price of capital and labour. The ultimate effect can be either narrower or wider depending on the repercussions

and second round effects. Hence the results should not be interpreted as the exact solutions to the generational imbalance problem but as indicators of the policy actions that can potentially reduce fiscal gap in an idealized framework. Secondly, generational accounts do not make any statement about the behavioural patterns that can arise from fiscal policy actions. It is possible to say that a 0.2% rise in the income tax revenues would remedy the imbalance but whether this rise will be reached through a cut or an increase in the income brackets is open to debate. Likewise, a 50% rise in the corporate tax revenues appears to alleviate the imbalance given the current fiscal structure yet it is unknown whether such policy will encourage tax evasion and informality. The literature on tax morale and informality is very limited yet they could have been exceedingly relevant and complementary to GA analysis. This should be remarked as further research.

Table 24: Generational Accounts under Alternative Scenario 4 (TL)
(50% Increase in the Corporate Tax Revenue)

Generation's Age in 2008	Net Lifetime Payments		
	Males	Females	Total
0	55,130	-760	27,185
5	65,550	-870	32,340
10	78,380	-170	39,105
15	99,480	650	50,065
20	116,720	430	58,575
25	129,560	-2,010	63,775
30	149,690	-7,360	71,165
35	150,070	-14,960	67,555
40	123,960	-26,000	48,980
45	81,070	-37,900	21,585
50	28,060	-41,400	-6,670
55	2,430	-46,640	-22,105
60	-14,030	-47,550	-30,790
65	-28,370	-56,780	-42,575
70	-33,10	-49,620	-41,360
75	-39,950	-49,450	-44,700
80	-43,490	-47,720	-45,605
Future Newborns	41,660	-4,610	18,525
Percentage Difference			-31.85%

*Discount rate (r) =5%, Growth Rate (g) =1.5%, Medium Population Growth

Table 25: Generational Accounts under Low, Medium and High Population Assumptions (thousand TL)

Generation's Age in 2008	Net Tax Burden								
	Low			Medium			High		
	Males	Females	Total	Males	Females	Total	Males	Females	Total
0	53.4	-0.6	26.4	49.5	-1.0	24.2	46.6	-1.0	22,8
5	61.9	-0.6	30.6	58.9	-1.2	28.8	57.0	-1.1	27,9
10	73.2	0.2	36.7	70.5	-0.6	35.0	69.8	-0.3	34,7
15	92.8	1.2	47.0	89.5	0.2	44.8	90.0	0.6	45,3
20	110.2	1.3	55.8	104.8	-0.2	52.3	107.6	0.3	53,9
25	124.6	-1.0	61.8	116.0	-2.6	56.7	120.0	-2.3	58,8
30	139.2	-7.0	66.1	133.1	-8.1	62.5	132.8	-8.2	62,3
35	130.8	-15.6	57.6	131.5	-15.7	57.9	126.9	-16.1	55,4
40	102.6	-27.5	37.6	106.5	-26.7	39.9	102.8	-27.2	37,8
45	65.6	-39.9	12.8	67.4	-38.2	14.6	66.6	-39.1	13,8
50	22.5	-52.4	-14.9	20.0	-41.5	-10.7	19.0	-42.1	-11,6
55	-7.4	-66.8	-37.1	-3.0	-46.6	-24.8	-3.8	-46.6	-25,2
60	-32.9	-76.6	-54.7	-17.7	-47.4	-32.6	-17.0	-45.2	-31,1
65	-49.7	-82.8	-66.3	-31.1	-56.6	-43.9	-29.9	-54.4	-42,2
70	-57.9	-77.6	-67.7	-34.7	-49.4	-42.0	-35.9	-50.8	-43,3
75	-58.9	-69.4	-64.2	-40.6	-49.3	-44.9	-42.6	-51.3	-47,0
80	-49.8	-54.2	-52.0	-43.6	-47.5	-45.5	-43.1	-47.0	-45,1
Future Newborns	65.0	2.5	33.7	59.0	1.6	30.3	54.2	1.3	27.7
Percentage Diff.			27.73			24.30			21.69

A standardized practice in the GA literature is to calculate the relevant accounts under different fertility assumptions, which might be thought as an extension of the sensitivity analysis. Table 25 presents the generational accounts under low, medium and high fertility assumptions. In line with our expectations, the fiscal gap narrows down to 21.69% under high fertility scenario whereas it widens to 27.73% under low fertility projections.

CHAPTER
7

CONCLUSION

The contribution of this paper is to construct the first set of generational accounts for Turkey and compare them with the other studies in the literature. The analysis provides an addition to the existing GA literature by covering a case study that has not been analysed before. The study has also been insightful in revealing a number of structural features of the Turkish tax, transfer and social security system.

The results indicate that there exists a 24.3% fiscal imbalance to the disadvantage of future generations. The basic observation regarding the generational accounts is that there exists a huge gap among genders since women are net beneficiary of the government's redistributive policies and typically make one fifth of the tax contribution made by men. This pertains both to the fact that labour force participation rate is low for females in Turkey and women are traditionally engaged in activities that are not exchanged in the market. Turkish men appear to reach peak tax burden in the middle of their life cycle whereas women relish redistributive policies for more than half of their expected lifetime.

The policy experimentations revealed that in order to attain generational balance, a 56% decline in the government consumption, a 0.2% increase in the income tax revenue sourced from the highest income bracket and 10% decline in the social security contributions can be adopted. A change in the corporate taxes to pre-1983 levels would cause a 31% generational gap to the disadvantage of current new-borns.

To conclude, despite the frequently underlined problem of informality, presence of a huge tax wedge and generational imbalance, the Turkish fiscal sustainability is not as alarming as it is in many countries.

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APPENDIX A

AGE AND GENDER SPECIFIC DISTRIBUTION OF TAXES, TRANSFERS AND SOCIAL SECURITY COMPONENTS (DETAILED)

Table 26: Distribution of Income Tax (Males)

Age Interval	Share in the Income Tax Payment (%)	Amount of Tax Paid (Thousand TL)	Number of Individuals in the Population (Thousands)	Income Tax per Individual (TL)
15-19	0.77	291,699	3,141	92.87
20-24	2.53	962,445	3,173	303.32
25-29	7.73	2,941,159	3,296	892.34
30-34	12.39	4,711,645	2,892	1,629.20
35-39	16.64	6,328,845	2,644	2,393.66
40-44	14.55	5,535,085	2,360	2,345.38
45-49	13.45	5,114,108	2,122	2,410.04
50-54	8.02	3,051,106	1,790	1,704.53
55-59	4.30	1,636,578	1,388	1,179.09
60-64	2.10	798,757	1,004	795.57
65+	2.36	896,620	2,110	424.94
Total	**84.85**	**32,268,047**	**25,920**	**1,244.91**

Source: 2008 Household Budget Survey, Author's own calculations

Table 27: Distribution of Income Tax (Females)

Age Interval	Share in the Income Tax Payment (%)	Amount of Tax Paid (Thousand TL)	Number of Individuals in the Population (Thousands)	Income Tax per Individual (TL)
15-19	0.28	106,939	2,985	35,83
20-24	1.33	506,691	3,059	165,64
25-29	2.26	858.154	3,218	266,67
30-34	2.85	1,083,313	2,824	383,61
35-39	2.70	1,025,632	2,616	392,06
40-44	2.06	782,286	2,305	339,39
45-49	1.82	691,076	2,102	328,77
50-54	0.76	287,768	1,786	161,12
55-59	0.31	186,974	1,420	131,67
60-64	0.31	101,852	1,128	90,29
65+	0.48	182,282	2,727	66,84
Total	**15.15**	**5,812,967**	**26,170**	**222,12**

Source: 2008 Household Budget Survey, Author's own calculations

Table 28: Distribution of Corporate Tax (Males)

Age Interval	Share in the Corporate Tax Payment (%)	Amount of Tax Paid (Thousand TL)	Number of Individuals in the Population (Thousands)	Corporate Tax per Individual (TL)
15-19	0.10	17.513	3.141	5,58
20-24	1.61	271.419	3.173	85,54
25-29	5.47	924.875	3.296	280,61
30-34	8.86	1.497.765	2.892	517,90
35-39	18.39	3.108.054	2.644	1.175,51
40-44	19.70	3.329.509	2.360	1.410,81
45-49	17.09	2.888.360	2.122	1.361,15
50-54	10.57	1.786.665	1.790	998,14
55-59	6.25	1.056.805	1.388	761,39
60-64	3.36	567.329	1.004	565,07
65+	3.89	657.477	2.110	311,60
Total	**95.27**	**16,105,771**	**25.920**	**621,36**

Source: 2008 Household Budget Survey, Author's own calculations

Table 29: Distribution of Corporate Tax (Females)

Age Interval	Share in the Corporate Tax Payment (%)	Amount of Tax Paid (Thousand TL)	Number of Individuals in the Population (Thousands)	Corporate Tax per Individual (TL)
15-19	0.00	742	2.985	0,25
20-24	0.23	39.027	3.059	12,76
25-29	0.47	78.762	3.218	24,48
30-34	0.65	110.143	2.824	39,00
35-39	0.56	94.682	2.616	36,19
40-44	1.32	222.415	2.305	96,49
45-49	0.64	108.045	2.102	51,40
50-54	0.44	73.927	1.786	41,39
55-59	0.19	32.422	1.420	22,83
60-64	0.15	25.095	1.128	22,25
65+	0.08	14.014	2.727	5,14
Total	**4,73**	**799,274**	**26.170**	**30,54**

Source: 2008 Household Budget Survey, Author's own calculations

Table 30: Distribution of Indirect Taxes (Males)

Age Interval	Share in Indirect Taxes (%)	Amount of Tax Paid (Thousand TL)	Number of Individuals in the Population (Thousands)	Indirect Taxes per Individual (TL)
15-19	1,48	1.618.993	3.141	515,44
20-24	2,93	3.194.873	3.173	1.006,89
25-29	6,98	7.614.661	3.296	2.310,27
30-34	9,30	10.143.704	2.892	3.507,50
35-39	11,34	12.361.642	2.644	4.675,36
40-44	10,22	11.140.260	2.360	4.720,45
45-49	10,62	11.582.042	2.122	5.458,08
50-54	8,79	9.584.728	1.790	5.354,60
55-59	6,34	6.918.281	1.388	4.984,35
60-64	4,35	4.746.930	1.004	4.728,02
65+	7,43	8.107.872	2.110	3.842,59
Total	**79,79**	**87,013,987**	**25.920**	**3.357,02**

Source: 2008 Household Budget Survey, Author's own calculations

Table 31: Distribution of Indirect Taxes (Females)

Age Interval	Share in Indirect Taxes (%)	Amount of Tax Paid (Thousand TL)	Number of Individuals in the Population (Thousands)	Indirect Taxes per Individual (TL)
15-19	0,89	965.659	2.985	323,50
20-24	1,77	1.927.065	3.059	629,97
25-29	2,37	2.580.692	3.218	801,96
30-34	2,39	2.601.737	2.824	921,30
35-39	2,45	2.669.635	2.616	1.020,50
40-44	2,34	2.553.650	2.305	1.107,87
45-49	2,00	2.178.804	2.102	1.036,54
50-54	1,87	2.040.666	1.786	1.142,59
55-59	1,24	1.354.751	1.420	954,05
60-64	0,84	917.103	1.128	813,03
65+	2,06	2.247.910	2.727	824,32
Total	**20,21**	**22,037,672**	**26.170**	**842,10**

Source: 2008 Household Budget Survey, Author's own calculations

Table 32: Distribution of Transfer Payments (Males)

Age Interval	Share in Transfer Payments (%)	Amount of Transfer Received (Thousand TL)	Number of Individuals in the Population (Thousands)	Transfer per Individual (TL)
15-19	0.28	23.051	3.141	7.34
20-24	0.79	65.017	3.173	20.49
25-29	1.07	87.832	3.296	26.65
30-34	2.08	171.187	2.892	59.19
35-39	2.90	238.498	2.644	90.20
40-44	2.44	201.076	2.360	85.20
45-49	5.06	417.050	2.122	196.54
50-54	6.37	524.912	1.790	293.25
55-59	7.26	597.687	1.388	430.61
60-64	6.59	542.396	1.004	540.24
65+	13.46	1.108.240	2.110	525.23
Total	**48.29**	**3,976,946**	**25.920**	**153.43**

Source: 2008 Household Budget Survey, Author's own calculations

Table 33: Distribution of Transfer Payments (Females)

Age Interval	Share in Transfer Payments (%)	Amount of Transfer Received (Thousand TL)	Number of Individuals in the Population (Thousands)	Transfer per Individual (TL)
15-19	1.06	87.375	2.985	29.27
20-24	1.90	156.217	3.059	51.07
25-29	1.66	136.655	3.218	42.47
30-34	3.61	297.226	2.824	105.25
35-39	4.09	336.464	2.616	128.62
40-44	3.73	307.472	2.305	133.39
45-49	4.48	369.324	2.102	175.70
50-54	5.02	413.150	1.786	231.33
55-59	5.37	442.230	1.420	311.43
60-64	4.65	383.162	1.128	339.68
65+	16.14	1.328.841	2.727	487.29
Total	**51.71**	**4,258,115**	**26.170**	**162.71**

Source: 2008 Household Budget Survey, Author's own calculations

Table 34: Distribution of Social Security Institution Benefits (Males)

Age Interval	Share in Transfer Payments (%)	Amount of Transfer Received (Thousand TL)	Number of Individuals in the Population (Thousands)	Transfer per Individual (TL)
15-19	0.28	271.527	3.141	86.45
20-24	0.79	765.867	3.173	241.37
25-29	1.07	1.034.622	3.296	313.90
30-34	2.08	2.016.494	2.892	697.27
35-39	2.90	2.809.392	2.644	1.062.55
40-44	2.44	2.368.575	2.360	1.003.63
45-49	5.06	4.912.640	2.122	2.315.10
50-54	6.37	6.183.205	1.790	3.454.30
55-59	7.26	7.040.462	1.388	5.072.38
60-64	6.59	6.389.166	1.004	6.363.71
65+	13.46	13.054.530	2.110	6.186.98
Total	**48.29**	**46,846,479**	**25.920**	**1.807.35**

Source: 2008 Household Budget Survey, Author's own calculations

Table 35: Distribution of Social Security Institution Benefits (Females)

Age Interval	Share in Transfer Payments (%)	Amount of Transfer Received (Thousand TL)	Number of Individuals in the Population (Thousands)	Transfer per Individual (TL)
15-19	1.06	1.029.241	2.985	344.80
20-24	1.90	1.840.157	3.059	601.56
25-29	1.66	1.609.734	3.218	500.23
30-34	3.61	3.501.179	2.824	1.239.79
35-39	4.09	3.963.377	2.616	1.515.05
40-44	3.73	3.621.868	2.305	1.571.31
45-49	4.48	4.350.454	2.102	2.069.67
50-54	5.02	4.866.709	1.786	2.724.92
55-59	5.37	5.209.250	1.420	3.668.49
60-64	4.65	4.513.457	1.128	4.001.29
65+	16.14	15.653.095	2.727	5.740.04
Total	**51.71**	**50,158,521**	**26.170**	**1.916.64**

Source: 2008 Household Budget Survey, Author's own calculations

Table 36: Distribution of Premium Payment (Males)

Age Interval	Share in Social Security Premia (%)	Amount of Tax Paid (Thousand TL)	Number of Individuals in the Population (Thousands)	Social Security Premia per Individual (TL)
15-19	0.39	220.254	3.141	70.12
20-24	2.53	1.422.509	3.173	448.32
25-29	9.05	5.081.792	3.296	1.541.81
30-34	13.16	7.390.441	2.892	2.555.48
35-39	18.47	10.371.040	2.644	3.922.48
40-44	15.80	8.872.396	2.360	3.759.49
45-49	13.77	7.732.151	2.122	3.643.80
50-54	6.85	3.847.052	1.790	2.149.19
55-59	3.13	1.758.106	1.388	1.266.65
60-64	1.35	756.041	1.004	753.03
65+	1.35	756.565	2.110	358.56
Total	**85.86**	**48,208,662**	**25.920**	**1.859.89**

Source: 2008 Household Budget Survey, Author's own calculations

Table 37: Distribution of Premium Payment (Females)

Age Interval	Share in Social Security Premia (%)	Amount of Tax Paid (Thousand TL)	Number of Individuals in the Population (Thousands)	Social Security Premia per Individual (TL)
15-19	0.21	115.429	2.985	38.67
20-24	1.66	931.679	3.059	304.57
25-29	2.72	1.528.423	3.218	474.96
30-34	2.59	1.456.440	2.824	515.74
35-39	2.82	1.582.544	2.616	604.95
40-44	2.11	1.187.454	2.305	515.16
45-49	1.34	749.806	2.102	356.71
50-54	0.46	260.898	1.786	146.08
55-59	0.10	58.533	1.420	41.22
60-64	0.12	66.447	1.128	58.91
65+	0.00	0	2.727	0.00
Total	**14.14**	**7,938,445**	**26.170**	**303.31**

Source: 2008 Household Budget Survey, Author's own calculations

APPENDIX B

DEMOGRAPHIC PROJECTIONS FOR SELECTED COUNTRIES

Table 38: Demographic Figures and Projections for Selected Countries for 2000, 2050 and 2100

Countries	Dependency Ratios (%)						Median Age		
	Old Age			Child					
	2000	2050	2100	2000	2050	2100	2000	2050	2100
Argentina	15.8	30.3	49.0	44.9	28.3	28.2	27.9	40.2	45.8
Australia	18.6	39.0	51.0	31.0	30.3	30.4	35.4	41.7	45.0
Austria	22.9	53.3	55.1	25.1	24.3	29.2	38.2	49.3	46.8
Belgium	25.7	44.2	47.3	25.9	30.2	30.5	39.1	43.2	44.0
Brazil	8.5	35.8	55.1	43.4	29.4	29.2	25.4	44.9	47.5
Canada	18.4	42.3	51.8	27.9	27.5	29.5	36.8	44.0	45.8
Czech R.	19.7	48.6	47.8	23.9	27.3	29.6	37.4	45.8	44.9
Denmark	24.7	40.9	48.7	27.7	29.0	30.8	38.4	43.3	44.2
France	24.0	43.4	50.1	28.9	30.6	30.6	37.7	42.7	44.7
Germany	22.1	56.5	51.7	23.1	26.6	30.2	39.9	49.2	45.3
Hungary	27.1	43.6	44.7	24.7	26.4	29.7	38.5	45.3	43.9
Italy	25.2	61.7	54.1	21.2	27.0	29.3	40.2	49.6	46.4
Japan	20.8	69.6	59.8	21.4	26.2	29.4	41.3	52.3	47.8
Netherlands	20.0	46.0	49.9	27.4	28.7	30.4	37.3	44.8	44.7
New Zealand	18.0	38.8	49.1	34.7	31.1	30.8	34.3	41.3	44.3
Norway	23.4	40.5	48.9	30.9	30.5	30.7	36.9	42.0	44.2
Poland	18.0	47.9	47.4	28.3	25.6	29.6	35.3	47.4	44.7
Portugal	23.9	63.5	56.6	23.9	23.4	28.6	37.7	52.1	47.7
S. Korea	10.2	60.7	57.1	29.2	24.4	29.7	32.1	51.8	46.9
Singapore	10.3	57.6	58.8	30.1	16.8	18.0	34.1	51.4	47.0
Spain	24.7	61.9	57.0	21.6	27.7	29.1	37.6	48.9	47.5
Sweden	26.7	42.3	50.9	28.6	29.8	30.3	39.4	43.0	45.1
Thailand	10.0	41.4	48.6	34.7	23.8	22.8	30.2	46.8	45.5
Turkey	8.0	30.5	50.5	47.9	25.0	27.4	24.5	42.3	46.9
UK	24.3	39.9	50.0	29.2	29.1	30.4	37.7	42.9	44.7
US	18.7	35.4	45.4	32.3	31.4	30.9	35.3	40.0	43.2
WORLD	10.9	25.7	37.4	48.0	32.4	30.0	26.7	37.9	41.9

Source: UN World Prospects, World Population Prospects, the 2010 Revision

APPENDIX C

SENSITIVITY ANALYSIS FOR SELECTED COUNTRIES

Table 39: Sensitivity analysis for Selected Countries

		g=1%			*g=1.5%*			*g=2%*		
		r=3%	***r=5%***	***r=7%***	***r=3%***	***r=5%***	***r=7%***	***r=3%***	***r=5%***	***r=7%***
Japan	Newborn	242.1	120.1	62.4	291.1	143.4	73.8	349.8	171.4	87.4
	Future	510.6	356.5	283.3	571.5	386.2	297.6	644.3	421.6	314.9
	Imbalance	110.9	196.8	354.0	96.3	169.3	303.3	84.2	146.0	260.3
Germany	Newborn	255.7	140.2	72.6	292.3	165.0	86.7	329.1	193.1	103.0
	Future	431.8	284.3	196.7	472.8	316.8	214.6	504.3	353.3	235.8
	Imbalance	68.9	102.8	170.9	61.8	92.0	147.5	53.2	83.0	128.9
Italy	Newborn	157.2	101.1	62.5	171.6	114.2	70.9	183.2	128.4	80.5
	Future	312.6	249.5	212.8	331.5	264.8	221.0	347.6	282.1	230.9
	Imbalance	98.9	146.8	240.5	93.2	131.9	211.7	89.7	119.7	186.8
Canada	Newborn	190.1	93.1	44.8	231.9	113.8	54.8	281.8	138.5	66.9
	Future	198.3	94.2	44.3	232.8	114.0	49.6	271.9	129.6	57.2
	Imbalance	4.3	1.2	-1.1	0.4	0.2	-9.5	-3.5	-6.4	-14.5
Thailand	Newborn	14.1	7.0	3.9	17.2	8.3	4.5	21.1	9.9	5.3
	Future	6.1	-0.1	-2.5	8.9	1.0	-2.0	12.6	2.4	-1.5
	Imbalance	-56.7	-101.4	-164.1	-48.3	-88.0	-144.4	-40.3	-75.8	-128.3

Source: Taken from Auerbach, Kotlikoff and Leibfritz (1999)

APPENDIX D

TEZ FOTOKOPİSİ İZİN FORMU

ENSTİTÜ

Fen Bilimleri Enstitüsü	
Sosyal Bilimler Enstitüsü	X
Uygulamalı Matematik Enstitüsü	
Enformatik Enstitüsü	
Deniz Bilimleri Enstitüsü	

YAZARIN

Soyadı : Hacıibrahimoğlu
Adı : Damla
Bölümü : İktisat

TEZİN ADI (İngilizce) : Generational Accounting in Turkey

TEZİN TÜRÜ : Yüksek Lisans [X] Doktora [ ]

1. Tezimin tamamından kaynak gösterilmek şartıyla fotokopi alınabilir. [ ]
2. Tezimin içindekiler sayfası, özet, indeks sayfalarından ve/veya bir bölümünden kaynak gösterilmek şartıyla fotokopi alınabilir. [ ]
3. Tezimden bir (1) yıl süreyle fotokopi alınamaz. [x]

TEZİN KÜTÜPHANEYE TESLİM TARİHİ: